STATE OF CONNECTICUT

TRAFFIC RECORDS ASSESSMENT

April 22 – 27, 2012

National Highway Traffic
Safety Administration
Technical Assessment Team

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EXECUTIVE SUMMARY

The National Highway Traffic Safety Administration (NHTSA) assembled a team to conduct a traffic records assessment in response to a request from the Highway Safety Office (HSO) in the Bureau of Policy and Planning of the Connecticut Department of Transportation. The HSO carried out the logistical and administrative steps necessary for an onsite assessment. A team of professionals with backgrounds and expertise in the various traffic records data systems (crash, driver, vehicle, roadway, citation and adjudication, and injury surveillance) conducted the assessment April 22-27, 2012.

The scope of this assessment included all of the components of a traffic records system. The purpose was to determine whether the traffic records system in Connecticut is capable of supporting management's need to identify the State's highway safety problems, to manage the countermeasures applied in attempts to reduce or eliminate those problems and to evaluate those efforts for their effectiveness.

Background

Connecticut underwent a traffic records assessment in 2007; the report contained recommendations for improvement of the traffic records system. During this assessment, the State has demonstrated progress in its traffic records system that has resulted from implementation of some of the recommendations for improvement and the State's own initiative in identifying and seeking solutions.

The number of crash reports completed using field data collection software has increased and has reduced the need for data entry at Connecticut Department of Transportation's (ConnDOT) Crash Records Section, though a backlog continues to exist. Additionally, approximately 10 to 15 percent of citations are currently electronically processed and convictions are electronically transmitted to the DMV to update the driver history file.

Significant progress has been made in the ISS component systems. All EMS patient care reports are being submitted and data are accessible at the Office of Emergency Medical Services; the statewide EMS database is 95 percent NEMSIS-compliant. All 13 trauma centers in the State are now submitting data to the Department of Public Health for analysis.

A major upgrade of the driver and vehicle databases is underway and improved vetting of applicants is made possible through use of facial recognition technology.

At this time, however, some opportunities remain to improve the ability of the present traffic records system to optimally support Connecticut's management of its highway safety programs. These are discussed in the summary below and the full report that follows.

Crash Records

Connecticut is to be commended for the progress they have made in the last several years to improve their crash data system. The Connecticut State Police (CSP) has implemented electronic

data collection and report submission to ConnDOT. Several local law enforcement agencies (LEAs) are using a variety of software packages for collecting crash data in the field. Although none of these agencies is currently submitting data electronically to ConnDOT, such submissions are likely to be supported in the near future. The University of Connecticut is developing a new crash data repository, supported by Section 408 funds through the Highway Safety Office, that holds the promise of collection and storage of a complete, multi-year crash database along with improved access for users to analytic resources. Roll-out of a Model Minimum Uniform Crash Criteria (MMUCC) compliant, fully electronic crash report for use by LEAs is being pursued by ConnDOT and its many safety partners through the auspices of the Traffic Records Coordinating Committee (TRCC). There is much to be hopeful about for the future of Connecticut's crash data system.

Unfortunately, there are systemic barriers to reaching a high level of data quality—chiefly with regard to crash data timeliness and completeness. This has to do with the large backlog of reports to be entered into the ConnDOT crash database, and the fact that ConnDOT's data entry process results in an incomplete record since only a subset of data elements is entered into the file.

Connecticut would be best served by incorporating the recommendations of this assessment into its Strategic Plan for Traffic Records Improvement and by addressing specific recommendations in the Business Plan for crash records.

Roadway Data

Both the roadway and crash files have shortcomings that impede credible analysis toward problem identification and countermeasure development by safety officials at the State and local levels. The Roadway Inventory System (RIS) is cumbersome to users for ad hoc queries since they must request the reports from the Office of Information Systems. The RIS is presently under review and evaluation by ConnDOT. The timeliness, completeness, and accuracy (especially location data) of crash data, is questionable.

A draft Law Enforcement Data Improvement Business Plan, under review by ConnDOT safety officials outlines a method for managing major safety projects envisioned by ConnDOT toward successful completion that will greatly enhance the ability of all safety stakeholders to develop and implement effective safety projects. The plan includes projects that emphasize efficiencies in crash reporting through electronic data collection and roadway data organization through digitized roadway networks and iterative data retrieval techniques for use by highway safety practitioners.

Driver and Vehicle Records

The Connecticut Department of Motor Vehicles administers the driver licensing and vehicle title and registration functions for the State. During this assessment, a major overhaul of these systems is underway which will improve functions for both systems. The new system integrates driver and vehicle files by collecting the vehicle owners' driver license or identification card number upon registration of a vehicle.

Data accessibility from the driver/vehicle files appears to be excellent, as applicable under the Driver Privacy Protection Act, in that researchers, law enforcement, judicial and prosecutorial personnel all have the ability to access the data in a timely manner.

Significant efforts to ensure driver identity have been undertaken and vetting is supported by facial recognition software and fraudulent document recognition training of driver licensing staff. The State is compliant with the relevant Real ID requirements at this time.

The Department of Motor Vehicles has administrative license sanction authority for driving under the influence of alcohol and there is a points system which results in license suspension once a driver has accumulated specified levels of points due to convictions of traffic offenses.

The vehicle titling and registration systems rely on VIN verification software to ensure accurate VIN numbers are included in the record, and to save keystrokes for employees. The State is a participant in the National Motor Vehicle Title Information System.

While the new system promises improved data, that effort is enhanced by management and personnel who are actively working on ensuring that they adequately identify persons to whom they issue driver licenses and identification cards.

Statewide Injury Surveillance System Records

Connecticut's Injury Surveillance System (ISS) is housed in the Connecticut Department of Public Health (DPH) Injury Prevention Program (IPP); however, a recent loss of funding from the Centers for Disease Control and Prevention has placed the program in jeopardy.

Connecticut has all of the primary components of a comprehensive injury surveillance system; however, some systems are undergoing changes of varying degrees. Some of these components are managed by divisions within the DPH, including a pre-hospital data collection system managed by the Office of Emergency Medical Services (OEMS) and vital records data managed by the Office of Vital Records (OVR). Each trauma center manages a trauma registry and submits data to DPH on an annual basis, while hospital emergency department and inpatient discharge data are managed by the Connecticut Hospital Association and submitted to DPH.

Office of Emergency Medical Services (OEMS)	Pre-hospital data Trauma Registry data
Connecticut Hospital Association (CHA)	Emergency Department data Hospital Discharge data
Office of Vital Records (OVR)	Death Certificate data
Injury Prevention Program (IPP)	Crash Outcome Data Evaluation System (CODES)

Each of these divisions compiles information on persons injured or killed as the result of a motor vehicle crash, among other causes. Analyses from these databases are available in numerous formats, including standardized reports, ad hoc data requests, and specialized reports; summary reports using hospital and vital records data are available on the Department's webpage.

Since the last assessment in 2007, significant progress has been made in the ISS component systems. All EMS patient care reports are being submitted and data are accessible at the OEMS; the statewide EMS database is 95 percent NEMSIS-compliant. All 13 trauma centers in the State are now submitting data to DPH for analysis. Considering the predominantly volunteer nature of the EMS system and independence of trauma centers, the establishment of electronic capture and submission of those two systems, along with the recent advent of an electronic death reporting system, are successes for which the DPH and its partners in the field should be commended.

Both individually and together, through the data integration projects such as CODES, injury surveillance datasets may be used for problem identification and traffic safety program planning. The successful linkage efforts of crash and hospital emergency department and inpatient data in CODES should be enhanced with emergency medical services, trauma registry, citation and driver licensing information. Inclusion of personal identifiers in the databases will lead to a higher linkage rate and enhance the quality of the CODES data. Many agencies present at the assessment expressed interest in utilizing CODES data. This acceptance and willingness to expand the use of injury-related data in the traffic safety community and support for maintaining the IPP is very encouraging.

Citation and Adjudication Records

Traffic citations may either be paper or electronic within the State of Connecticut. Currently, electronic citations account for about 10 to 15 percent of the total citation volume. The proliferation of the use of electronic citations, while an obviously popular process for law enforcement officers, has been limited due to the cost of the printers required to issue such citations to the violator.

Uniform citations have been developed for two types of traffic violations in the State of Connecticut—infractions and traffic misdemeanors. These violations are processed by either the Centralized Infractions Bureau (CIB) or the Superior Court, as appropriate. The Administrative Office of Courts has the authority to determine the content of both forms. Processing of these centrally-managed, uniform, sequentially numbered citations lends itself to citation tracking.

Case management of traffic violations by the adjudicatory authorities is handled either by the CIB or the Court's Criminal Motor Vehicle System (CMVS). From these two systems, dispositions are transmitted electronically to the Department of Motor Vehicles for inclusion on the driver history file.

Merging the citation data from the files at the CIB and the Superior Court would provide an effective citation tracking system, which could be used to ensure that all relevant dispositions are sent to the Department of Motor Vehicles, provide a picture of the cited versus convicted charges, and a full record of the traffic enforcement annually. Such data would be useful in determining whether and which enforcement activities were effective in reducing traffic crashes, injuries and fatalities.

Traffic Records Coordinating Committee (TRCC)

The central role of the Traffic Records Coordinating Committee (TRCC) within a state is to facilitate information sharing, cooperation, and the coordination and uniformity of data. Further, the TRCC must be the source of decision-making about data systems that make up the component parts of the traffic records system, when issues touch more than one of the component systems, or when the needs of users, collectors and owners within a single component of the system diverge.

Connecticut's TRCC reports difficulty in coming to final determinations on data and traffic records system direction. This final authority, which is apparently lacking in Connecticut, is generally the function of the executive level of a TRCC. Reportedly, the State lacks that tier of TRCC involvement. This results in a less than optimal situation for data coordination. While the working level committee appears to be active, involved and enthusiastic, the lack of the decision-making authority of an Executive level has hampered the progress of the TRCC. Currently, the working level committee is facilitated by a consultant.

Institutionalization of the TRCC, involving a Charter which clearly outlines its authority, duties, and responsibilities, is a realistic next step. The Charter will help to clarify who speaks for the TRCC and to ensure that the person who is designated as the voice of the TRCC does so with the support of Executives who have the authority to set the mission and vision of the Committee, and to approve, overrule, or negotiate decisions that may not be unanimous among the various Departments that are responsible for the databases or activities that comprise the traffic records system. The TRCC should have a number of voting members who are responsible for selection of projects that make up the strategic plan for traffic records. Providing an equal opportunity for the component members of the TRCC to have a voice in the future of traffic records in the State is a means to ensure that the process is truly one which meets the needs of all data users, and thereby, ensure that data-driven, evidence-based decisions are being applied to all traffic safety efforts in Connecticut.

Strategic Planning

It is readily apparent that the Traffic Records Strategic Plan (TRSP) is driven by the Section 408 Application process. Although traffic records assessments are designed to provide information to the State as to deficiencies in their traffic records systems that would provide the basis for developing a TRSP, the time frame between assessments and the annual time constraints for the Section 408 Application submission influence the focus toward obtaining funding for ongoing, and in most cases meritorious, projects. Longer term planning (and visioning) is a luxury impeded by day-to-day operational pressures.

The TRSP should be developed apart from the preparation of the Section 408 Application. Ideally the Section 408 Application should be prepared based on the TRSP proposed projects and an overall vision of the state's future traffic safety data needs and the means by which they are best addressed.

The following are the major recommendations for improvements to the State's traffic records system. The references indicate the sections of the report from which the recommendations are drawn.

MAJOR RECOMMENDATIONS

Crash Records System

- ❑ Finalize and approve the draft Business Plan and monitor its completion. Implement the projects with merit and provide operational support and funding. **(Section 2-A)**

- ❑ Establish a position for a full time manager of the crash data improvement process. The individual selected should be empowered to implement the Business Plan – working with partners responsible for each of the projects and promoting the plan throughout the State and especially among law enforcement. **(Section 2-A)**

Citation and Adjudication Records

- ❑ Take advantage of the data sharing effort being lead by the Connecticut Criminal Justice Information System (CJIS) group. The Connecticut Information Sharing System (CISS), currently being planned by CJIS, offers a structure to further the TRCC's efforts in data sharing. CISS offers the possibility of cooperation in the area of network access, data specifications, user security and privileges and vendor participation. **(Section 2-E)**

Traffic Records Coordinating Committee (TRCC)

- ❑ Formally establish a two-tier TRCC consisting of an Executive and Technical Committee. Seek the commitment of the pertinent agencies to fulfill the potential for improvements that exists. **(Section 1-A)**

Driver and Vehicle Records

- ❑ Complete the Connecticut Integrated Vehicle and Licensing System modernization project. (**Section 2-C)**

Data Uses and Program Management

- ❑ Continue to promote the use of data within the traffic safety community and the public as a whole. Task various data owners to provide short training sessions to TRCC members about the capabilities and uses of their systems and data, as well as the availability of such data to assure that no opportunity to use data is lost to ignorance of its existence. **(Section 1-D)**

Statewide Injury Surveillance System (SWISS)

- ❑ Continue to support the implementation and maintenance of the State EMS database. Pursue financial means to support the EMS system, such as State budget line items or surcharges on driver licenses, vehicle registrations, or moving violations. Financial stability is critical to the success of this system component. **(Section 2-F)**

- ❑ Support current efforts within the trauma community to organize and standardize data collection in the trauma registry. Uniformity is critical to a data system. **(Section 2-F)**

- ❑ Explore funding options to support the Injury Surveillance System in the absence of the Centers for Disease Control and Prevention grant. The continuation of the Injury Prevention Program, Crash Outcome Data Evaluation System, and strengthening of the data management staff over EMS, hospital, trauma registry, and mortality data will directly impact the success of the traffic records system. **(Section 2-F)**

Roadway Information

- ❑ Designate the Crash Data Repository at the University of Connecticut as the State's official crash file. However, custodial responsibility should be retained by Connecticut Department of Transportation with tight oversight accountability. **(Section 2-B)**

Strategic Planning

- ❑ Charge the Traffic Records Coordinating Committee with the development of a new Traffic Records Strategic Plan (TRSP) addressing the recommendations in this traffic records assessment. Identify deficiencies apart from those noted in the traffic records assessment by canvassing each Traffic Records Coordinating Committee member and especially each traffic records system component custodian for their input. The TRSP should be developed apart from the preparation of the Section 408 Application. Ideally the Section 408 Application should be prepared based on the TRSP proposed projects. **(Section 1-B)**

- ❑ Assure that all Traffic Records Coordinating Committee members participate in the development of the Traffic Records Strategic Plan and the selection and priority setting of the projects in the Plan. It is advisable to acquire the skills of a facilitator to conduct workshops for the Plan development. **(Section 1-B)**

ACKNOWLEDGMENTS

The Traffic Records Assessment Team would like to acknowledge Joseph Cristalli, Jr., Program Coordinator, Highway Safety Office, Connecticut Department of Transportation; Juliet Little, Highway Safety Management Specialist, Highway Safety Office, Connecticut Department of Transportation; and David Bozak, Consultant, InfoGroup, Inc.

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INTRODUCTION

A complete traffic records system is necessary for planning (problem identification), operational management or control, and evaluation of a State's highway safety activities. Each State, in cooperation with its political subdivisions, should establish and implement a complete traffic records system. The statewide program should include, or provide for, information for the entire State. This type of program is basic to the implementation of all highway safety countermeasures and is the key ingredient to their effective and efficient management.

As stated in the *National Agenda for the Improvement of Highway Safety Information Systems*, a product of the National Safety Council's Association of Transportation Safety Information Professionals (formerly the Traffic Records Committee):

> "Highway safety information systems provide the information which is critical to the development of policies and programs that maintain the safety and the operation of the nation's roadway transportation network."

A traffic records system is generally defined as a virtual system of independent real systems which collectively form the information base for the management of the highway and traffic safety activities of a State and its local subdivisions.

Assessment Background

The Traffic Records Assessment is a technical assistance tool that the National Highway Traffic Safety Administration (NHTSA), the Federal Motor Carrier Safety Administration (FMCSA) and the Federal Highway Administration (FHWA) offer to State offices of highway safety to allow management to review the State's traffic records program. NHTSA has published a *Traffic Records Program Assessment Advisory* which establishes criteria to guide State development and use of its highway safety information resources. The Traffic Records Assessment is a process for giving the State a snapshot of its status relative to that *Advisory*.

This assessment report documents the State's traffic records activities as compared to the provisions in the *Advisory*, notes a State's traffic records strengths and accomplishments, and offers suggestions where improvements can be made.

Report Contents

In this report, the text following the "*Advisory*" excerpt heading was drawn from the *Traffic Records Program Assessment Advisory*. The "*Advisory*" excerpt portion is in italics to distinguish it from the "Status and Recommendations" related to that section which immediately follows. The status and recommendations represent the assessment team's understanding of the State's traffic records system and their suggestions for improvement. The findings are based entirely on the documents provided prior to and during the assessment, together with the information gathered through the face-to-face discussions with the listed State officials. Recommendations for improvements in the State's records program are based on the assessment team's judgment.

SECTION 1: TRAFFIC RECORDS SYSTEM MANAGEMENT

Advisory Excerpt: *Management of a State TRS requires coordination and cooperation. The data that make up a TRS reside in a variety of operational systems that are created and maintained to meet primary needs in areas other than highway safety. Ownership of these databases usually resides with multiple agencies, and the collectors and users of the data span the entire State and beyond.*

The development and management of traffic safety programs should be a systematic process with the goal of reducing the number and severity of traffic crashes. This data-driven process should ensure that all opportunities to improve highway safety are identified and considered for implementation. Furthermore, the effectiveness of highway safety programs should be evaluated. These evaluation results should be used to facilitate the implementation of the most effective highway safety strategies and programs. This process should be achieved through the following initiatives.

1-A: Traffic Records Coordinating Committee

Advisory Excerpt: *The National Highway Traffic Safety Administration's (NHTSA) 2004 Initiatives to Address Improving Traffic Safety Data Integrated Project Team report (hereafter referred to as the Data IPT Report) includes guidance on establishing a successful Traffic Records Coordinating Committee (TRCC). The following include recommendations from the Data IPT Report and additional items of an advisory nature:*

- *Establish a two-tiered TRCC.*
  There should be an executive and a working-level TRCC. The executive-level TRCC should be composed of agency directors who set the vision and mission for the working-level TRCC. The Executive TRCC should review and approve actions proposed by the Working TRCC. The Working TRCC should be composed of representatives for all stakeholders and have responsibilities, defined by the Executive TRCC, for oversight and coordination of the TRS. Together, the two tiers of the TRCC should be responsible for developing, maintaining, and tracking accomplishments related to the State's Strategic Plan for Traffic Records Improvement.

- *Ensure Membership is Representative.*
  TRCCs should be representative of all stakeholders, and each stakeholder representative must have support from their top management. When departments are considering changes to their systems, all TRCC members should be notified and departments should consider how to accommodate the needs of all the TRCC agencies.

- *Authorize Members.*
  The Working TRCC should have formal standing, recognition, and support of the administrators of participating agencies. This support will help the TRCC succeed in overcoming the institutional barriers, lack of focus, and lack of resources that prevent collaboration and progress in integrating highway safety data. The exact role and powers of the TRCC should be made explicit in its charter. Legislators, the governor, and top management of participating agencies should give authority to the TRCC members to make policy decisions and commit their agencies' resources to solve problems and approve the State's strategic plan for traffic records. The most important responsibility of the TRCC should be to provide the leadership necessary to ensure that available funds are sufficient to match stated needs. Despite challenges stemming from collective decision making by members from different agencies with competing priorities, TRCC members should speak with "one voice." The TRCC should have guidelines to determine who speaks for the TRCC and how its recommendations should be communicated.

- *Appoint an Administrator/Manager.*
  A single point of contact for managing a data improvement project is necessary to ensure leadership. The TRCC should designate a traffic records administrator or manager and provide sufficient time and resources to do the job. This person should be responsible for coordinating and scheduling the TRCC, in addition to tracking the progress of implementing the State's traffic records strategic plan. Uniform criteria should be established for monitoring progress. NHTSA can facilitate training for the TRCC administrator/manager regarding traffic record systems, program management, and data analysis.

- *Schedule Regular Meetings.*
  The TRCC should establish a schedule of regular meetings, not only to discuss data coordination issues and make progress on the strategic plan, but also to share success stories to aid in overcoming fears of implementation. The meetings should take place as required to deal with the State's traffic records issues and to provide meaningful coordination among the stakeholders. The TRCC should gain broader support by marketing the benefits of improved highway safety data. An example to provide data and analytical expertise to local government officials, legislators, decision makers, community groups, and all other stakeholders. TRCC meetings should include strategy sessions for such marketing plans.

- *Oversee Quality Control/Improvement.*
  The TRCC should have oversight responsibility for quality control and quality improvement programs affecting all traffic records data. Regularly scheduled presentations of quality control metrics should be part of the TRCC meeting agenda and the TRCC should promote projects to address the data quality problems that are presented.

- *Oversee Training for TRS Data Improvement.*
  The TRCC should have oversight responsibility for encouraging and monitoring the success of training programs implemented specifically to improve TRS data quality. Regularly scheduled presentations of training needs and training participation should be part of the TRCC meeting agenda, and the TRCC should promote projects to conduct training needs assessments and address the identified training needs.

1-A: Traffic Records Coordinating Committee Status

Establish a two-tiered TRCC
Connecticut does have an active Traffic Records Coordinating Committee (TRCC) that has met since 1993. Currently, the TRCC is advising stakeholder groups on several large scale projects involving crash reporting, citations and data integration.

The TRCC has not been formally established by Executive Order or Memorandum of Understanding signed by the major stakeholder agencies. While the TRCC recognizes the existence of a two-tiered system and has established such a structure, it is *pro forma* in nature.

Ensure Membership is Representative
The working membership of the TRCC is varied and includes the major agencies representing Roadway, Law Enforcement (state and local), Department of Motor Vehicles, Judicial, Public Health and Regional Planning Organizations.

Authorize Members
Members of the TRCC include staff from:

- Department of Transportation
- Department of Motor Vehicles
- Department of Public Safety
- Criminal Justice Information Systems
- Department of Public Health
- Judicial Branch
- Federal Agencies (FHWA, NHTSA, FMCSA)
- Regional Planning Organizations
- Local Law Enforcement Agencies
- Law Enforcement Organizations
- University of Connecticut
- Research Organizations and Companies

Appoint an Administrator/Manager
The State has a designated Traffic Records Coordinator, whose position has other assigned duties and responsibilities. Additionally, the TRCC utilizes the services of a contractor to act as a facilitator to the planning process.

Schedule Regular Meetings
The TRCC meets on a monthly basis. The TRCC also utilizes a TRCC web page to publish information for its members and interested parties.

Oversee Quality Improvement
There are several major projects underway in Connecticut at this time and the TRCC and the Highway Safety Office (HSO) understand the needs for coordination of projects and various specifications. However, while perceiving this need, there is still a lack of staff designated for this role. There are currently plans to hire a "data champion" within the Bureau of Policy and Planning for this purpose.

Oversee Training for Traffic Records System Data Improvement
The TRCC has become a nexus for data systems improvement and the coming improvements in traffic records. There is yet no formal approach to training of the various users of the traffic records systems.

Conclusion
The Connecticut TRCC has planned a variety of traffic records improvements such as:

- A revised MMUCC–compliant crash report
- A single crash repository
- A reduction in the delay in crash reporting
- Planned increased use of electronic crash reporting
- Planned increased use of electronic citations

These are all initiatives that offer great potential for improvements in the traffic records process in terms of timeliness and quality of data. While such planning is commended, the TRCC must now proceed to implementation and deployment phases of the various improvements.

These subsequent phases require a level of coordination and attention to detail that does not seem currently present within the TRCC or Highway Safety Office. The TRCC has not been formally constituted by Executive Order or Memorandum of Understanding and the leadership of the pertinent agencies have not decisively engaged in the direction of the proposed new projects. For the current efforts of the TRCC to be successful, each agency must understand and commit to the necessary steps for improvements.

Recommendations:

- ❑ Formally establish a two-tier TRCC consisting of an Executive and Technical Committee. Seek the commitment of the pertinent agencies to fulfill the potential for improvements that exists.

- ❑ Hire a "Data Champion" to oversee the coordination of projects within the State.

- ❑ Establish a training plan for the user components of the traffic records system.

1-B: Strategic Planning

Advisory Excerpt: *The TRS should operate in a fashion that supports the traffic safety planning process. The planning process should be driven by a strategic plan that helps State and local data owners identify and support their overall traffic safety program needs and addresses the changing needs for information over time. Detailed guidance for strategic planning is included in the NHTSA Strategic Planning Guide and the FHWA Strategic Highway Safety Plan documents. The strategic plan should address activities such as*

- ❑ *Assign Responsibility for the Strategic Plan.*
  The strategic plan should be created and approved under the direction of the TRCC. The TRCC should continuously monitor and update the plan, to address any deficiencies in its highway traffic records system.

- ❑ *Ensure Continuous Planning.*
  The application of new technology in all data operational phases (i.e., data collection, linkage, processing, retrieval, and analysis) should be continuously reviewed and assessed. The strategic plan should address the adoption and integration of new technology as this facilitates improving TRS components.

- ❑ *Move to Sustainable Systems.*
  The strategic plan should include consideration of the budget for lifecycle maintenance and self-sufficiency to ensure that the TRS continues to function even in the absence of grant funds.

- ❑ *Meet Local Needs.*
  The strategic plan should encourage the development of local and statewide data systems that are responsive to the needs of all stakeholders.

- ❑ *Promote Data Sharing.*
  The strategic plan should promote identification of data sharing opportunities and the integration among federal, State, and local data systems. This will help to eliminate duplication of data and data entry, assuring timely, accurate, and complete traffic safety information.

- ❑ *Promote Data Linkage.*
  Data should be integrated to provide linkage between components of the TRS. Examples of valuable linkages for highway and traffic safety decision making include crash data with roadway characteristics, location, and traffic counts; crash data with driver and vehicle data; and crash data with adjudication data, healthcare treatment and outcome data (e.g., Crash Outcome Data Evaluation System [CODES]).

- ❑ *Coordinate with Federal Partners.*
  The strategic plan's budget-related items should include coordination between the State and the various federal programs available to fund system improvements. The data collection, management, and analysis items in the strategic plan should include coordination of the State's systems with various federal systems (e.g., the Fatality Analysis Reporting System [FARS], the Problem Driver Pointer System [PDPS] of the National Driver Registry [NDR], the Motor Carrier Management Information System [MCMIS], and the Commercial Driver License Information System [CDLIS]).

- ❑ *Incorporate Uniform Data Standards.*
  The strategic plan should include elements that recognize and schedule incorporation of uniform data elements, definitions, and design standards in accordance with national standards and guidelines. Current examples of these standards and guidelines include:

  - *Model Minimum Uniform Crash Criteria (MMUCC)*
  - *American National Standards Institute (ANSI) -D20.1 and ANSI-D16.1*
  - *National Governors Association (NGA)*
  - *Global Justice XML Data Model (GJXDM)*
  - *National Center for State Courts, Technology Services, Traffic Court Case Management Systems Functional Requirement Standards*
  - *Guidelines for Impaired Driving Records Information Systems*

- *National Emergency Medical Service Information System (NEMSIS) Data Dictionary.*

❑ *Plan to Meet Changing Requirements.*
To help the State meet future highway safety challenges, the strategic plan should include a periodic review of data needs at the local, State, and federal levels. It should be updated to include tasks to meet those needs as they are identified.

❑ *Support Strategic Highway Safety Planning and Program Management.*
The strategic plan should include elements designed to ensure that the State captures program baseline, performance, and evaluation data in response to changing traffic safety program initiatives. Additional elements should be present for establishing and updating countermeasure activities (e.g., crash reduction factors used in project selection and evaluation).

❑ *Strategic Planning of Training and Quality Control.*
The strategic plan should incorporate activities for identifying and addressing data quality problems, especially as these relate to training needs assessments and training implementation.

1-B: Strategic Planning Status

The Traffic Records Strategic Plan (TRSP) has been updated each year in conjunction with the preparation of the Section 408 Application for traffic records funding from NHTSA. The most recent update (2011) reflects projects initiated as a result of the 2007 traffic records assessment. The Traffic Records Coordinating Committee (TRCC) reviews and endorses the plan as reflected in the 408 Application. The TRCC develops the plan and sets the priority of the projects in the plan.

The Connecticut TRCC operates by the appointment of the administrators of the Connecticut Department of Transportation, Connecticut Department of Motor Vehicles, Connecticut Department of Public Health, and the Judicial Branch who represent the core safety data systems. The TRCC meets monthly.

A primary objective of the TRCC, as reflected in the Strategic Plan, has been a state crash data repository (CDR) as outlined and discussed in the *2007 Traffic Records Assessment.* The TRCC has also continued to emphasize the development and implementation of data transmittal protocols that allow for the upload of data to the appropriate State and local databases. Traffic crash reporting that is timely, complete and accurate provides valuable data to many different groups of people.

The University of Connecticut (UConn) is working to create a CDR under an HSO grant, which will allow law enforcement agencies, capturing PR-1 data to submit motor vehicle crash files electronically to the repository. The CDR will contain all of the crash data as recorded on the Police Crash report, the PR-1. This data query and analysis toolset will provide members of the traffic safety community with timely, accurate, complete and uniform crash data. This program is still in a pilot phase.

As a result of discussions by stakeholders during the March and April 2011 meetings of the TRCC, the following projects were proposed in the Section 408 6th year application, for safety data improvements.

•	State Motor Vehicle Crash Data Repository	$168,400
•	Crash Outcome Data Evaluation System (CODES)	40,000
•	E-Citation Processing System	100,000
•	E-Citation – State Law Enforcement	100,000
•	E-Citation – Local Law Enforcement (CRCOG)	50,000
•	E-Citation – Local Law Enforcement (Ansonia Group)	50,000
	Total 408 funding requested	$**508,400**

It is readily apparent that the TRSP is driven by the Section 408 Application process. Although traffic records assessments are designed to provide information to the State as to deficiencies in their traffic records systems that would provide the basis for developing a TRSP, the time frame between assessments and the annual time constraints for the Section 408 Application submission influences the focus toward obtaining funding for ongoing, and in most cases meritorious,

projects. Longer term planning (and visioning) is a luxury impeded by day-to-day operational pressures.

Assign Responsibility for the Strategic Plan
The responsibility for the TRSP development is clearly stated in both the *Advisory* and the State's response in the Section 408 Application as residing with the TRCC. A TRCC spans several organizations at different levels of government and the private sector. Strategic planning is difficult under any circumstance, but especially so when the organizational culture does not support it. The HSO Chief and the TRCC Coordinator attempt to satisfy the requirements of the *Advisory*, the Section 408 Application and the TRSP in conjunction with the TRCC.

Ensure Continuous Planning
The update process for the TRSP is ongoing from the 408 submission in June to October start-up for each year's new safety data improvement project implementations. After October, planning for the following year's application process begins.

Move to Sustainable Systems
The TRSP does anticipate "out-year" funding as well as current year funding (self-sufficiency and lifecycle maintenance) but the HSO admits that there is room for improvement in this area. The justification for traffic records projects is guided by the long-term needs of the State. Most projects are sustainable without federal funds, particularly 408 funds. However, a major project, the Crash Data Repository, is not. Connecticut Department of Transportation (ConnDOT) is aware of this and is deliberating on the long-range implications of the project because of its role as the custodian of the State crash file.

Meet Local Needs
Local road property damage only (PDD) crash reports were previously not entered into the ConnDOT crash file. This is addressed in three out of the four main projects submitted through four years of Section 408 applications. Local PDO crash data for 2007, 2008 and 2009 (partial) have now been entered into the ConnDOT crash file. Entry of local road PDO crashes will continue for the remainder of 2009 as well as 2010.

Promote Data Sharing
The TRSP contains several projects that will provide opportunities for data sharing among safety stakeholders at the State and local levels. One example (that is expanding as development continues) is the Crash Data Repository, which can be accessed online.

Promote Data Linkage
The TRSP has several projects that as development proceeds will promote data linkage. Most noteworthy of these is the Crash Data Repository which is envisioned as a safety data warehouse.

Coordination with Federal Partners
The TRCC's focus through its continual planning and update of the TRSP is the coordination of FARS, SafetyNet, MCMIS, HPMS, MMUCC and NEMSIS with State and Federal reporting systems and guidelines.

Incorporate Uniform Data Standards
The TRSP addresses the MMUCC and NEMSIS guidelines. The HPMS has been adopted by ConnDOT in the Roadway Inventory System. MIRE is under consideration by ConnDOT and the University of Connecticut as they develop the Crash Data Repository.

Plan to Meet Changing Requirements
The identification of needs and emerging technologies is incorporated in individual projects proposed each year as part of the Section 408 application.

Support Strategic Highway Safety Planning and Program Management
The TRCC follows the recommendations from NHTSA coupled with State Highway Safety agreements when incorporating progress reporting in the TRSP.

Strategic Planning of Training and Quality Control
There are several individual projects, such as e-citation mobile data for local law enforcement, in the 2011 TRSP that address training needs.

Many of the system components have quality control mechanisms in place through system and logic edits and manual quality assurance procedures. These mechanisms, in many instances, are not enough. The *Model Performance Measures for State Traffic Records Systems* has been published by NHTSA. The *Model* recommends quality metrics for each component of a traffic records system. The *Model* does not state that each of the quality metrics suggested for each component should be applied, but does suggest that these measures or others developed by the states should be considered to measure the quality of each component system and to be able to determine the effect of projects on the quality of the system component in general.

The *Model* provides definitions of the performance measures and examples of how the measures can be applied. It is recommended that these measures be reviewed in the strategic planning and the project selection processes and applied where appropriate. Consideration of quality control or quality metrics at the planning and implementation stages of a project has more potential for success in measuring quality for a particular system and evaluating the effectiveness of the projects selected. The results of the quality assurance and control mechanisms should be a primary source of information for ongoing and new training efforts relating to data collection, data entry and data use for each system component.

Recommendations:

- ❑ Charge the Traffic Records Coordinating Committee with the development of a new Traffic Records Strategic Plan (TRSP) addressing the recommendations in this traffic records assessment. Identify deficiencies apart from those noted in the traffic records

assessment by canvassing each Traffic Records Coordinating Committee member and especially each traffic records system component custodian for their input. The TRSP should be developed apart from the preparation of the Section 408 Application. Ideally the Section 408 Application should be prepared based on the TRSP proposed projects.

- ❑ Assure that all Traffic Records Coordinating Committee members participate in the development of the Traffic Records Strategic Plan and the selection and priority setting of the projects in the Plan. It is advisable to acquire the skills of a facilitator to conduct workshops for the Plan development.

- ❑ Include items in each TRCC meeting agenda that address progress reports on each system and project, as well as the status of the quality metrics developed by the TRCC following the guidelines in NHTSA's *Model Performance Measures for State Traffic Records Systems*.

1-C: Data Integration

Advisory Excerpt: *The Data IPT Report recommends that States integrate data and expand their linkage opportunities to track traffic safety events among data files. Integrated data should enable driver license and vehicle registration files to be updated with current violations, prevent the wrong driver from being licensed, or keep an unsafe vehicle from being registered. Integration should ensure that all administrative actions are available at the time of the driver's sentencing. Data linkage is an efficient strategy for expanding the data available, while avoiding the expense and delay of new data collection.*

State TRCCs should develop working relationships with the health care community to ensure that the causation, crash, emergency medical services, hospital, and other injury-related data linked during the event can be merged statewide. They should also link to other data such as vehicle insurance, death certificates, medical examiner reports, etc., to support analysis of State-specific public health needs.

Linkage with location-based information such as roadway inventory databases and traffic volume databases at the State level can help identify the kinds of roadway features that experience problems, allowing States to better address these needs through their various maintenance and capital improvement programs. Data integration should be addressed through the following:

- *Create and Maintain a Traffic Records System Inventory.*
  The TRS documentation should show the data elements and their definitions and locations within the various component systems. Ancillary documentation should be available that gives details of the data collection methods, edit/error checking related to each data element, and any known problems or limitations with use of a particular data element. The system inventory should be maintained centrally, ideally in a data clearinghouse, and kept up-to-date through periodic reviews with the custodial agencies. Funding for system development and improvement should include a review of existing systems' contents and capabilities.

- *Support Centralized Access to Linked Data.*
  The traffic records user community should be able to access the major component data files of the TRS through a single portal. To support this access, the State should promote an enterprise architecture and database, and develop a traffic records clearinghouse to serve as the gateway for users. The databases in the clearinghouse should be linked in ways that support highway safety analysis. At a minimum, this would include linkage by location, involved persons, and events.

- *Meet Federal Reporting Requirements.*
  The TRS, where possible, should link to or provide electronic upload files to federal data systems such as FARS, MCMIS/SafetyNet, Highway Performance Monitoring System (HPMS), and others.

- *Support Electronic Data Sharing.*
  The TRS should support standard methods for transporting data between systems. At a minimum, these should include a documented file structure and data definitions for information to be transferred to statewide databases. Standard information transfer formats and protocols, such as XML format and FTP, should be supported.

- *Adhere to State and Federal Privacy and Security Standards.*
  The TRS should make linked data as accessible as possible while safeguarding private information in accordance with State and federal laws. This includes security of information transferred via the Internet or other means.

1-C: Data Integration Status

Create and Maintain a Traffic Records System Inventory

A traffic records system inventory does not exist. The only information available to describe the components of Connecticut's traffic records system is in NHTSA's Traffic Records Improvement Program Reporting System (TRIPRS).

A complete system inventory, as called for in the *Advisory*, would include the data elements and their definitions and locations within the various component systems. Ancillary documentation should be available that gives details of the data collection methods, edit/error checking related to each data element, and any known problems or limitations with use of a particular data element. The system inventory should be maintained centrally, ideally in a data clearinghouse, and kept up-to-date through periodic reviews with the custodial agencies. Funding for system development and improvement should include a review of existing systems' contents and capabilities.

Support Centralized Access to Linked Data

There are few current examples of centralized access to linked data. Users within the Connecticut Department of Transportation (ConnDOT) have access to a merged dataset containing both crash and roadway inventory information. This dataset is made possible through the manual location coding process for crashes managed by the Crash Data and Analysis Section.

The University of Connecticut (UConn) Connecticut Transportation Institute (CTI) in the School of Engineering is developing the Crash Data Repository (CDR). The CDR currently only contains crash data, but there are plans to add roadway features. The CDR will provide online access to linked crash and roadway inventory information.

Epidemiologists at the Connecticut Department of Public Health (DPH) have managed the State's Crash Outcome Data Evaluation System (CODES) program since 1997. As part of this project, there has been successful integration of police crash reports, emergency department and hospital inpatient records; data from 1999 and 2001-2009 have been linked using probabilistic methodologies and software set forth by NHTSA. Connecticut has been an active member of the NHTSA CODES Network and the analysts provide data upon request to the Highway Safety Office for problem identification purposes. In 2011, funding from the Centers for Disease Control and Prevention to support these efforts was discontinued and states may not re-apply for those funds for five years. This presents a significant challenge to DPH and the traffic records community because it threatens the sustainability of an established integration project.

Research staff at the Yale University School of Medicine successfully integrated trauma registry data from Yale-New Haven Hospital and driver data from the Department of Motor Vehicles and collaborated with the ConnDOT to study alcohol-related crashes.

Meet Federal Reporting Requirements
Federal reporting requirements for the Highway Performance Monitoring System, Federal Aid System, SafetyNet requirements to the FMCSA, and the Fatality Analysis Reporting System (FARS) are all being met.

Support Electronic Data Sharing
There are numerous examples of electronic data sharing. The Collision Analysis System (CAS) managed by the Crash Data and Analysis Section is currently accepting about 35 percent of crash reports electronically from the Connecticut State Police (CSP). The CSP electronic crash data collection system is able to send information about reportable CMV involved crashes to the SafetyNet system at the DMV. DMV driver and vehicle files are used to reduce keying and support validation of driver and vehicle information.

Traffic convictions are transmitted electronically to the DMV, which is the agency that maintains the official driver history file in the State. Additionally, traffic dispositions are reported both on paper and electronically to the issuing law enforcement agency as well as the CSP.

Adhere to State and Federal Privacy and Security Standards
Connecticut is well aware of the need to protect personal identifying information and has implemented data security procedures in line with their privacy laws as well as the Driver Privacy Protection Act (DPPA) and the Health Insurance Portability and Accountability Act (HIPAA).

Recommendations:

- ❑ Develop a statewide traffic records system inventory.
- ❑ Develop additional linked datasets including merged data sets for crash, roadway, injury surveillance, citation/adjudication, vehicle, and driver information.
- ❑ Develop a public-use version of all linked datasets and provide a centralized access point for these resources.

1-D: Data Uses and Program Management

Advisory Excerpt: *Data availability and quality directly affect the effectiveness of informed decision making about sound research, programs, and policies. Accurate, comprehensive, and standardized data should be provided in a timely manner to allow the agency or decision-making entities at the State or local levels to:*

- *Conduct Problem Identification.*
  Problem identification is the process of determining the locations and causes of crashes and their outcomes and of selecting those sites and issues that represent the best opportunity for highway safety improvements. States should be able to conduct problem identification activities with their traffic records system.
- *Develop Countermeasure Programs and Program Management Procedures.*
  States select and evaluate strategies for preventing crashes and improving crash outcomes. This requires that decision makers can select cost-effective countermeasures and that safety improvement programs and funds should be managed based on data-driven decision making.
- *Perform Program Evaluation.*
  States should be capable of measuring progress in reducing crash frequency and severity. Ideally, the effectiveness of individual programs and countermeasures should be evaluated and the results used to refine development and management processes.
- *Support Safety-Related Policies and Planning.*
  The States are responsible for developing SHSPs. These data should be available to support this and other policy and planning efforts such as development of agency-specific traffic safety policies, traffic records strategic planning, safety conscious planning, and others.
- *Access Analytic Resources.*
  Data users, and decision makers in particular, should have access to resources including skilled analytic personnel and easy to use software tools to support their needs. These tools should be specifically designed to meet needs such as addressing legislative issues (barriers as well as new initiatives), program and countermeasure development, management, and evaluation, as well as meeting all reporting requirements.
- *Provide Public Access to Data.*
  The TRS should be designed to give the public or general non-government user reasonable access to data files, analytic results, and resources, but still meet State and federal privacy and security standards.
- *Promote Data Use and Improvement.*
  The TRS should be viewed as more than just a collection of data repositories, and rather as a set of processes, methods, and component systems. Knowledge of how these data should be collected and managed, along with where the bottlenecks and quality problems arise, is critical to users understanding proper ways to apply the data. This knowledge should also aid in identifying areas where improvement is possible.

1-D: Data Uses and Program Management Status

Conduct Problem Identification

The Accident Records and Statistics Section of the Office of Inventory and Forecasting is responsible for the codification, maintenance and compilation of motor vehicle traffic crash data. The Connecticut Highway Safety Office (HSO) uses this traffic crash data to create and evaluate the Connecticut Highway Safety Plan. Unfortunately, this data is incomplete and generally has a 14 month data entry backlog. These issues have impacted the HSO's problem identification and program evaluation processes. The HSO is pilot testing the creation and maintenance of a Crash Data Repository at the University of Connecticut to eliminate this data entry and coding backlog. The Crash Data Repository would accept primarily electronic data transfers to move closer to "real time" data collection and reporting.

Develop Countermeasures Programs and Program Management Procedures

For the last ten years, the Connecticut Highway Safety Office has used contracted consultants to gather, evaluate and create reports from the Connecticut and Fatality Analysis Reporting System (FARS) traffic crash data. The HSO Program Managers use the consultants' reports to identify and prioritize problem areas for the Highway Safety Plan.

Perform Program Evaluation

The Highway Safety Office with guidance from the Region 1 NHTSA Office coordinates traffic and highway safety research for Connecticut. The State has entered into a contract with a consultant to support and evaluate data from such research projects. Connecticut currently does not have any traffic or highway safety research projects underway.

The Connecticut Highway Safety Office Program Managers are responsible for evaluating the projects in their program areas. The HSO publishes annual output reports on the Highway Safety Plan.

Support Safety-Related Policies and Planning

The Highway Safety Office is responsible for developing the Strategic Highway Safety Plan (SHSP), the Highway Safety Plan (HSP) and the Traffic Records Strategic Plan (TRSP); the responsibility for the SHSP is shared by the Office of Engineering. These multi-agency strategic plans are designed to provide all traffic safety agency stakeholders in Connecticut with a planning and coordination tool to facilitate collaboration between the stakeholder agencies.

The crash data backlog (approximately 14 months), and having to rely on a crash file with approximately 33 percent of the data recorded from the police crash report, has hindered prompt and reliable responses to requests. These challenges are being addressed by the development of the State's new Crash Data Repository.

Access Analytic Resources

Since the 2007 traffic records assessment, there has been some improvement in access to analytic resources in the State.

Connecticut Department of Transportation (ConnDOT) uses resources at the University of Connecticut (UConn) and other consultant services to support development of the HSIP, SHSP, HSP, and to conduct traffic safety analysis. These organizations are an excellent analytic resource and could also be used for training existing staff (transfer of knowledge) as well as developing statistics for supporting safety programs. UConn also hosts a popular online data query tool that uses their Crash Data Repository (CDR). The CDR is currently open to the public after registration and is available at http://www.ctcrash.uconn.edu.

ConnDOT and other State agencies use technology and web sites to provide access to safety data and support analyses. Many of these resources are discussed in the "Provide Public Access to Data" section of this report.

ConnDOT also supports a number of legacy systems with access limited to staff. Examples of these systems are:

- Traffic Accident Surveillance Report (TASR) – TASR consists of a database in which ConnDOT provides crash frequencies, location information, traffic volumes, facility classification and related data for thousands of locations on state-maintained roads.
- Suggested List of Surveillance Study Sites (SLOSSS).
- Traffic Accident Viewing System (TAVS) – TAVS is a standalone client-based system providing access to crash data.
- Crash Analysis System (CAS) – CAS is the data entry and management system for the ConnDOT Accident History File. It also provides a number of standard reports to support safety analysis.

The ConnDOT has an opportunity to further enhance its safety planning and programming functions by including several analytic software tools suggested in the recently published Highway Safety Manual. *SafetyAnalyst* has the capability not only to identify crash patterns at specific locations and determine whether those crash types are over-represented, but also to determine the frequency and percentage of particular crash types system wide or for specified portions of the system (particular highway segment or intersection types). This capability can be used to investigate the need for system-wide engineering improvements and for enforcement and public education efforts that may be effective in situations where engineering countermeasures are not.

Provide Public Access to Data

Staff members in ConnDOT Crash Data and Analysis section run statistical analyses on the crash data and produce booklets, research reports, and comprehensive annual fact books. Those resources are available on the State webpage under Other Reports, http://www.ct.gov/dot/cwp/view.asp?a=3609&q=430368. The most recent fact book is the *Connecticut Traffic Accident Facts 2008*, published in April 2011.

There is limited online access for any component of the traffic records system at this time. Crash data are available through the Internet using the Crash Data Repository that is currently being piloted by UConn. That system creates public accessibility to the crash file.

Offices in the Department of Public Health (DPH) manage the hospital emergency department and inpatient, and vital statistics datasets. Regulations set forth in the Health Insurance Portability and Accountability Act (HIPAA) prevent public access to the personal information contained in these files. However, each of those files is used to generate summary reports available on the DPH website, http://www.ct.gov/dph/site/default.asp.

ConnDOT has also provided crash report data to the Injury Prevention Program (IPP) at DPH for inclusion in the CODES project. IPP manages the Connecticut CODES project, provides analytical support for the Highway Safety Office and DPH, develops fact sheets and conducts research projects as requested.

In summary, there are several agencies the public may approach with a traffic safety data request, including DMV, ConnDOT, DPH (CODES) and even local entities such as transportation planning organizations. However, this requires coordination between those agencies that will direct requests for crash report data to the Crash Data and Analysis Section at ConnDOT where analysts respond as quickly as possible. Analysts at DPH may respond to requests that go beyond crash data alone, but efforts are made to coordinate and ensure the requestor receives accurate information from just one source.

Promote Data Use and Improvement

The Connecticut HSO is a leader of the data systems being improved and coordinated or integrated within the traffic safety community in the State. The TRCC, the HSO Manager and the Traffic Records Coordinator have taken an active role in the effort to improve data collection and use in the crash, citation, roadway, driver, vehicles and medical databases. The projects identified in the Strategic Plan are aimed at reducing the bottlenecks and inadequacies of the present systems and to systematically improve the process of data collection and use.

Recommendation:

- ❑ Continue to promote the use of data within the traffic safety community and the public as a whole. Task various data owners to provide short training sessions to TRCC members about the capabilities and uses of their systems and data, as well as the availability of such data to assure that no opportunity to use data is lost to ignorance of its existence.

Advisory Excerpt: *At the time of passage of the Highway Safety Act of 1966, State centralized TRS generally contained basic files on crashes, drivers, vehicles, and roadways. Some States added data on traffic safety-related education, either as a separate file or as a subset of the Driver File. As traffic safety programs matured, many States incorporated EMS and Citation/Conviction Files for use in safety programs. Additionally, some States and localities maintain a Safety Management File that consists of summary data from the central files that can be used for problem identification and safety planning.*

As the capabilities of computer hardware and software systems increased and the availability of powerful systems has expanded to the local level, many States have adopted a more distributed model of data processing. For this reason, the model of a TRS needs to incorporate a view of information and information flow, as opposed to focusing only on the files in which that information resides.

Under this more distributed model, it does not matter whether data for a given system component are housed in a single database on a single computer or spread throughout the State on multiple local systems. What matters is whether the information is available to users, in a form they can use, and that these data are of sufficient quality to support its intended uses. Thus, it is important to look at information sources. These information sources have been grouped to form the major components of a TRS:

- *Crash Information*
- *Roadway Information*
- *Driver Information*
- *Vehicle Information*
- *Citation/Adjudication Information*
- *Statewide Injury Surveillance Information*

Together, these components provide information about places, property, and people involved in crashes and about the factors that may have contributed to the crash or traffic stop. The system should also contain information that may be used to judge the relative magnitude of problems identified through analysis of data in the TRS. This includes demographic data (social statistics about the general population such as geographic area of residence, age, gender, ethnicity, etc.) to account for differences in exposure (normalization) and data for benefit/cost and cost effectiveness determinations. Performance level data should be included to support countermeasure management.

A frequently used overview of the contents of a TRS is the Haddon Matrix, named after its developer, William Haddon, the first NHTSA Administrator. It provides a valuable framework for viewing the primary effects of Human, Vehicle, and Environmental factors and their influence before, during, and after a crash event. Table 1 is based on the Haddon Matrix.

Table 1: Expanded Haddon Matrix With Example Highway Safety Categories

	Human	***Vehicle***	***Environment***
Pre-Crash	· *Age* · *Gender* · *Experience* · *Alcohol/Drugs* · *Physiological Condition* · *Psychological Condition* · *Familiarity with Road & Vehicle* · *Distraction* · *Conviction & Crash History* · *License Status* · *Speed*	· *Crash Avoidance* · *Vehicle Type* · *Size & Weight* · *Safety Condition, Defects* · *Brakes* · *Tires* · *Vehicle Age* · *Safety Features Installed* · *Registration*	· *Visibility* · *Weather/Season* · *Lighting* · *Divided Highways* · *Signalization* · *Geographic Location* · *Roadway Class, Surface, Cross-Section, Alignment, etc.* · *Structures* · *Traffic Control Devices, Signs, Delineations, and Markings* · *Roadside Appurtenances, Buildups, Driveways, etc.* · *Volume of Traffic* · *Work Zone* · *Animal Range Land & Seasonal Movements*

Crash	· *Belt Use* · *Human Tolerance* · *Size* · *Seating Position* · *Helmet Use*	· *Crash-Worthiness* · *Passenger Restraints* · *Airbags and Airbag Shutoff*	· *Guardrails* · *Median Barriers* · *Breakaway Posts* · *Rumble Strips and Other Safety Devices* · *Maintenance Status of Roadway and Devices*
Post-Crash	· *Age* · *Physical Condition* · *Insurance Status* · *Access to Health Care* · *Driver Control Actions* · *Court Actions* · *Probation*	· *Post Crash Fires* · *Fuel Leakage* · *Power Cell Securement* · *Hazardous Materials* · *Title*	· *Traffic Management* · *Bystander Care* · *EMS System* · *First Responders* · *Hospital Treatment* · *Long-Term Rehabilitation*

The Haddon Matrix has proven to be a meaningful way to examine primary effects of contributing factors on crash frequency and severity. It helps decision makers to consider countermeasures designed to address specific contributing factors. In recent years, with availability of more detailed data analyses, awareness has grown about the interactions among contributing factors. A good example of such interactions would be weather and drivers' skill or experience levels. To make the contribution of interaction effects more obvious, the matrix in Table 2 can be used to supplement the Haddon Matrix.

Table 2: Examples of the Interactions among Crash Characteristics

	Human	***Vehicle***	***Environment***
Human	· *Road Rage* · *Ped/Bike Behavior & Driver Behavior* · *Driver Age & Passenger Age & Number*	· *Familiarity with Vehicle & Training* · *License Class & Vehicle Type* · *Rollover Propensity & Driver Actions* · *Vehicle Ergonomics & Person Size*	· *Crash Avoidance* · *Vehicle Type* · *Familiarity with Roadway* · *Experience with Weather Conditions*
Vehicle		· *Vehicle Size Weight Mismatch* · *Under-Ride/Over-Ride* · *Shared Roads, No-Zone* · *Tire Inflation & Rollover Propensity*	· *Rollover Propensity & Road Configuration* · *Roadway Debris & Vehicle Size Weight* · *Vehicle Type & Weather Conditions* · *Vehicle Condition & Weather Conditions*
Environment			· *Congestion Interaction with Road Type* · *Congestion & Vehicle Mix & Lane Width* · *Animal Management Policies & Roadway Access & Seasons*

Taken together, these views of traffic safety factors offer a way of thinking about highway safety issues that is both conceptually robust and practical. For the purposes of this Advisory, the most important aspect of the TRS is that it supports high-quality decision making to improve highway safety. The remainder of this section of the Advisory presents details about the various components of the TRS.

2-A: Crash Data Component

Advisory Excerpt:

- *Description and Contents*
  The Crash Data Component should document the time, location, environment, and characteristics (e.g., sequence of events, rollover, etc.) of a crash. Through links to other TRS components, the Crash Data Component should identify the roadways, vehicles, and people (e.g., drivers, occupants, pedestrians) involved in the crash. These data should help to document the consequences of the crash (e.g., fatalities, injuries, property damage, and violations charged), support the analysis of crashes in general, and the analysis of crashes within specific categories defined by:

  - *person characteristics (e.g., age or gender)*
  - *location characteristics (e.g., roadway type or specific intersections)*
  - *vehicle characteristics (e.g., condition and legal status)*
  - *the interaction of various components (e.g., time of day, day of week, weather, driver actions, pedestrian actions, etc.)*

  The Crash Data Component of the TRS contains basic information about every reportable (as defined by State statute) motor vehicle crash on any public roadway in the State.

- *Applicable Guidelines*
  Details of various data elements to be collected are described in a number of publications. The MMUCC provides a guideline for a suggested minimum set of data elements to be collected for each crash. Additional information should be collected for crashes involving an injury or fatality to meet the tracking and analysis requirements for the State and other systems (e.g., the FARS, SafetyNet).

- *Data Dictionary*
  Crash data should be collected using a uniform crash report form that, where applicable, has been designed and implemented to support electronic field data collection. Law enforcement personnel should receive adequate training at the academy and during periodic refreshers, to ensure that they know the purpose and uses for the data as well as how to complete each field on the form accurately.

  Information from the quality control program should be used to develop and improve the content of training. The training manual on crash reporting should be available to all law enforcement personnel. The instructions in the manual should match the edit checks that are performed on the crash data prior to its being added to the statewide crash database. The edit checks should be documented and sufficient to flag common and serious errors in the data. For example, these errors include missing or out of range values in single fields and logical inconsistencies between the data recorded in multiple fields (e.g., time of day is midnight and the lighting condition is coded as daylight). All data element definitions and all system edits should be shared with collectors, managers, and users in the form of a data dictionary that is consistent with the training manual and the crash report form.

- *Process Flow*
  The steps from initial crash event to final entry into the statewide crash data system should be documented in process flow diagrams. The diagram should be annotated to show the time required to complete each step and to show alternate flows and timelines depending on whether the reports are submitted in hardcopy or electronically to the statewide system. The process flow diagram should include procedures for error correction and error handling (i.e., returning reports to the originating officer/department, correction, resubmission, etc.). Process flow diagrams should show all major steps whether accomplished by staff or automated systems and should clearly distinguish between the two.

- *Interface with Other Components*
  The Crash Data Component has interfaces, using common linking variables shown in Table 3, to other TRS components to support the following functions:

- *Driver and vehicle data should be used to verify and validate the person and vehicle information during data entry and to flag records for possible updating in the driver or vehicle files when a discrepancy is identified. Key variables such as driver license number, vehicle identification number (VIN), license plate number, name, address, and date of birth should be available to support matching of records among the files. The Driver Data Component should also enable access to drivers' histories of crashes and convictions for traffic violations.*
- *Crash data should be linked to roadway inventory and other roadway characteristics based upon location information and other automated and manual coding methods. This linkage supports location-based analysis of crash frequency and severity as well as crash rate calculations based on location-specific traffic counts.*
- *Law enforcement personnel should be able to link crash, contact, incident, citation, and alcohol/drug test results through their own department's records and/or a secure law enforcement information network. For agencies with computer-aided dispatch and/or a records management system, the crash data should be linked to other data through incident, dispatch, and/or crash numbers and by names and locations to support analysis at the local level.*
- *Linkage to injury surveillance data should be possible either directly or through probabilistic linkage in order to support analysis of crash outcomes and overall costs of treatment. Key variables for direct linkage include names of injured persons or EMS run report number. Key variables for probabilistic linkage include the crash date and time, crash location, person characteristics such as date of birth and gender, EMS run report number, and other particulars of the crash.*

Table 3: Common Linking Variables between Crash And Other Data Components of a Traffic Records System

Crash Linkages to Other Law Enforcement and Court Files	- *Incident Number* - *Location (street address, description, coordinates, etc.)* - *Personal ID (name, address, DL number, etc.)*
Crash Linkages to Roadway Information	- *Location Coding (linear referencing system, reference post, coordinates, local street codes)*
Crash Linkages to Driver and Vehicle Information	- *Driver License Number* - *Vehicle Identification Number* - *Personal Identifiers (name, address, date of birth, etc.)*
Crash Linkages to Statewide Injury Surveillance System Information	- *Personal Identifiers (where allowed by law)* - *Crash Date, Time, Location* - *EMS Run Report Number* - *Unique Patient ID Number*

Furthermore, there should be data transfer and sharing linkages between State and local crash databases. The State crash data system should support the electronic transfer of crash data from a variety of law enforcement agencies' (LEAs) records management systems. The State's crash data system management should publish the specifications and editing requirements for generating the outputs from the various agency systems that can be processed into the official State crash data system.

- ❑ *Quality Control Program*

The crash data should be timely, accurate, complete, and consistent and these attributes should be tracked based on a set of established quality control metrics. The overall quality of the information in the Crash Data Component should be assured based on a formal program of error/edit checking as the data are entered into the statewide system. In addition, the custodial agency and the TRCC frequently work together to establish and review the sufficiency of the quality control program and to review the results of the quality control measurements. The crash data managers should receive periodic data quality reports. There should be procedures for sharing the information with data collectors through individual and agency-level feedback, as well as training and changes to the crash report instruction manual, edit checks, and data dictionary. Example measurements are presented in Table 4

Table 4: Examples of Quality Control Measurements for Crash Data

Timeliness	- *# days from crash event to receipt for data entry on statewide database* - *# days for manual data entry* - *# days for upload of electronic data* - *Average # of days to enter crashes into the system* - *Average # of days of backlogged crash reports to be entered*
Accuracy	- *% of crashes "locatable" using roadway location coding method* - *% VINs that are valid (e.g., match to vehicle records that are validated with VIN checking software)* - *% of interstate motor carriers "matched" in MCMIS* - *% crash reports with uncorrected errors* - *% crash reports returned to local agency for correction*
Completeness	- *% LEAs with an unexplained drop in reporting one year to the next* - *% LEAs with expected number of crashes each month* - *% FARS/MCMIS match* - *% FARS/State Crash fatality match*
Consistency	- *% time that an unknown code is used in fields with that possible value* - *% logical error checks that fail* - *% compliance with MMUCC guidelines*

The measures in Table 4 are examples of high-level management indicators of quality. The crash file managers should have access to a greater number of measures and be prepared to present a standard set of summary measures to the TRCC on a periodic schedule, such as monthly or quarterly.

2-A: Crash Data Component Status

The Connecticut Department of Transportation (ConnDOT), Crash Data and Analysis Section manages the State's centralized crash data repository referred to as the Accident History File (AHF). Records in the AHF are created based on information captured on the *Connecticut Uniform Police Accident Report (PR-1), rev. January 1, 1995.*

Approximately 110,000 crash reports are submitted annually to the Crash Data and Analysis Section. Law enforcement agencies (LEA) investigate all fatal and injury crashes, as well as all crashes involving property damage exceeding one thousand dollars. Approximately 65 percent of the reports are submitted on paper forms and the remaining 35 percent are submitted electronically. The latter are from the Connecticut State Police (CSP). An unknown number of local agencies are using various electronic crash data collection software, but none of their reports are submitted electronically to ConnDOT. Rather, they are printed and mailed to ConnDOT.

ConnDOT performs data entry on all the paper reports. Only a subset (about 1/3) of the fields from the paper crash reports is entered into the AHF. ConnDOT clerks perform location coding and quality control on all reports including those submitted by the CSP. The full record of each electronic crash submitted by CSP is retained at the Crash Data and Analysis Section, including the narrative and diagram. As such, approximately 35 percent of crash records are "complete" and the remaining 65 percent consist of partial data containing only those fields of importance to ConnDOT. The AHF is not designed to meet the needs of other users outside of ConnDOT. It was clear from the interviews that many users' needs from within ConnDOT are also not met by the truncated crash records.

Paper reports are not scanned to create an image file which can be accessed by users. The paper reports are stored for one year and then purged. The electronic report data can be used to generate an electronic PR-1 image for review. These are maintained indefinitely. Until all reports are collected and submitted electronically, it appears that ConnDOT does not have the resources internally to create an image archive based on scanned paper crash reports.

Electronically submitted data are held in a queue until such time as the manual data entry of paper reports has reached the same month and year. The current month being entered is February of 2011—approximately 14 months after the crash event. This backlog of crash reports and lack of timely data continues to be the greatest impediment to data-driven decision making within the State. Even with federal agency assistance, the crash data entry backlog cannot be reduced to less than 14 months. This compares poorly with the ability of many states to have data posted to a production crash database within a month of the crash event. Some states are going further and achieving "day-current" posting; making data available for analysis within 24 hours of the crash event.

ConnDOT currently maintains data on the AHF from 2003 to the present. Data are available on the ConnDOT stand-alone Traffic Accident Viewing System (TAVS) back to 1999.

The University of Connecticut (UConn), Connecticut Transportation Institute (CTI) in the School of Engineering is developing a Crash Data Repository (CDR) under contract to ConnDOT. UConn currently has the ConnDOT data subset back to 1995. The CDR (and its query tool) has proven very popular by end users and has significantly improved accessibility to crash data. A Memorandum of Understanding between UConn and the CSP supports a pilot project to transmit electronically submitted data directly to the CDR rather than having to wait until ConnDOT has completed data entry. UConn is not currently accepting data electronically from local law enforcement agencies. The proposed concept for the UConn CDR includes the possibility of storing complete records for all crashes—beyond the subset of data elements captured by ConnDOT. However, this possibility does not apply to reports submitted on paper.

UConn has also embarked on a second pilot project with the goal of reducing the data entry backlog. The project provides for selecting 10,000 crash reports from the backlog. It involves scanning, possible optical character recognition (OCR), and manual data entry. The pilot test will allow UConn and ConnDOT to determine if the backlog of approximately 60,000 crash reports can be significantly reduced or eliminated within one year. In addition, if the option exists, it would be preferable to avoid costs and expand the breadth of data captured by replacing the paper reports (those sitting in batches at ConnDOT) with electronically submitted reports. At present, this option is not supported by the University of Connecticut's proposal for backlog elimination; however, it must be recognized that until more information is known from the pilot test, the project timeline must be considered preliminary.

Following a multi-agency review of the current version of the crash report, a project is underway to simultaneously implement a MMUCC-compliant form and provide free electronic data collection software and interface for all LEAs based on a question and answer "TurboTax-type" approach. It was reported that many agencies that already have electronic crash data collection capabilities are waiting for this new system and form implementation before exploring electronic data submission to either ConnDOT or the UConn CDR.

A crash processing Business Plan has been developed in order to assure the above efforts are coordinated and developed in an efficient way to support the Connecticut safety community. The Business Plan is in draft form and provides the potential to serve as a tool to guide the completion of the various projects aimed at improving the crash data processes and system. The over-arching Business Plan incorporates all of the various projects into one coherent and well-sequenced set of timelines, milestones, and deliverables to help ConnDOT ensure success. The Business Plan will help the State attract funding (from USDOT and other sources). It will also enable stakeholders throughout government to monitor and promote the key projects that are incorporated into the plan.

The plan addresses the seven critical needs/projects:

1. Creation of the Crash Data Repository and specification of its desired functionality/contents.
2. Development of the digital roadway network in a statewide base map incorporating the ConnDOT linear reference system (LRS).

3. Achievement of 100 percent electronic data collection and electronic submission of crash reports to ConnDOT and the CDR.
4. A reduction of the data entry backlog.
5. Creation of a MMUCC compliant crash report form.
6. Transition of data quality staff.
7. Development of e-citation data collection and submission to court systems for adjudication and posting of final dispositions.

The system that exists today in ConnDOT does not meet the Agency's own needs and clearly does not serve the broader safety community. Connecticut is at a crossroads with respect to crash data processing. It is possible that the system could be maintained in its present form for a few more years. However, most of the projects included in the Business Plan are currently supported by grant funding which cannot be sustained for an extended period. It is time to evaluate the pilot studies in a timely fashion, develop conclusions and findings, and make the decisions that will provide a state-of-the-art crash processing system.

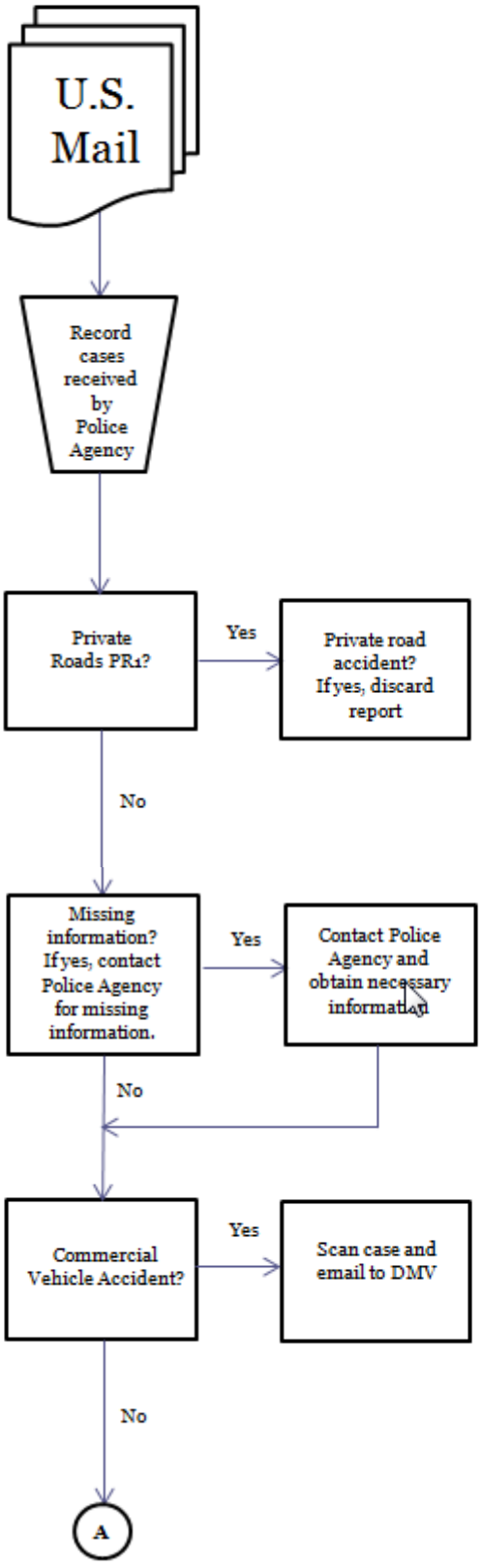
Applicable Guidelines
The current version of the PR-1 was not designed using MMUCC guidelines. The report form was designed with reference to ANSI D16.1 standards. The design of the new electronic PR-1 crash report form will increase MMUCC compliance. The new form has not received a formal MMUCC review.

Data Dictionary
There is a complete data dictionary for the AHF including data and logical business edits. In addition, officers are provided with an instruction manual that explains the data requirements for each of the fields on the PR-1.

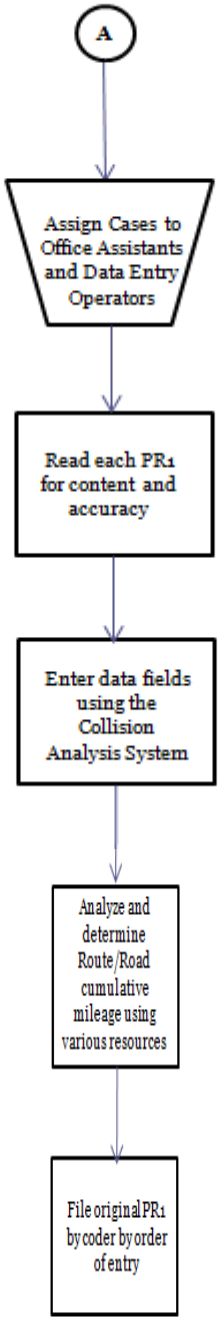
Documentation for the crash datasets managed at UConn, as part of the CDR, was not provided. However, a complete user guide for the data query tool is available on the UConn web site at http://www.ctcrash.uconn.edu.

Process Flow
The following paper crash report process flow diagram was supplied in response to the assessment questionnaire. Process flow diagrams for electronically submitted crash reports were not provided. The latter process will take on increasing importance for the future of the crash data component as plans for automated crash reporting by Connecticut law enforcement agencies call for electronic submission. It would be worthwhile to develop an annotated process flow diagram for the complete crash processing system.

PR1 Process


U.S. Mail
Record cases received by Police Agency
Private Roads PR1?
Yes
Private road accident? If yes, discard report
No
Missing information? If yes, contact Police Agency for missing information.
Yes
Contact Police Agency and obtain necessary information
No
Commercial Vehicle Accident?
Yes
Scan case and email to DMV
No
A

PR1 Process, cont.



There are separate processes for handling entry of cases into the Fatality Analysis Reporting System (FARS) and the Motor Carrier Management Information System (MCMIS) via SafetyNet.

There was some concern expressed regarding the ability to obtain missing fatal crash reports for the 2011 reporting year. Despite this, the FARS process appears to meet the federal agencies' requirements for reporting. As of the assessment week, there were still 59 crash reports that had

not been received for processing. Receiving fatal crash reports from local law enforcement in a timely manner is a continuing problem along with the receipt of BAC test results for surviving drivers.

The Connecticut Department of Motor Vehicles (DMV) is responsible for the upload of reportable CMV crashes into SafetyNet and subsequent uploading to MCMIS. DMV receives the majority of reportable CMV crashes electronically from the Connecticut State Police (CSP), which are uploaded electronically each month into SafetyNet. CSP accounts for approximately 80 percent of the State's reportable CMV crashes. The remainder of the reportable CMV crashes are forwarded to DMV from the ConnDOT in a PDF format and entered by DMV personnel into SafetyNet. Even though SafetyNet reporting of CMV-involved crashes has been experiencing some delay and completeness issues, DMV is meeting FMCSA requirements.

Interface with Other Components

The crash data component has some limited interfaces with other traffic records components. In real-time, driver and vehicle data on the electronic PR-1 can be validated against the corresponding driver license and vehicle registration databases. The driver and vehicle information is auto-populated in the electronic field data collection systems. The manual location coding process links roadway data to crash data using the ConnDOT linear referencing route and milepost system. Although the Connecticut CODES project is in jeopardy due to lack of funding, crash data have been linked to medical outcome data using probabilistic matching. The CSP electronic data collection system provides an interface to the SafetyNet system.

Quality Control Program

The crash data quality control program managed by the Crash Data and Analysis Section, exhibits some of the attributes of a formal, comprehensive data quality management program.

Data quality is managed at two points in the process from the initial crash event through final posting of data at ConnDOT. LEAs generally include a supervisory review of the reports prior to submission to ConnDOT. As these reports are entered into the AHF at ConnDOT, edit checks are run to validate data types, data value ranges, and logical agreement among two or more data fields. The CSP has implemented all of the ConnDOT edit checks in their field data collection software. It was reported that other LEAs have not implemented the edit checks or have implemented them and later turned them off—sending the data to ConnDOT without being checked. The CSP system also has the ability to automatically complete driver and vehicle fields on the crash report form based on input of the driver's license number and plate number, respectively. It is unknown whether other vendor products in use by local LEAs have similar capabilities. It is known that at least some of these other systems have the capability to check report data for errors, but some of the LEAs ignore or defeat the error checking.

Because ConnDOT currently focuses on about 1/3 of all fields on the crash report form, any suite of edit checks that relies solely on ConnDOT's edits is likely to be inadequate for the task of improving data quality for all key fields on the report.

ConnDOT did provide some very limited quality metrics for the purpose of this assessment. The following data quality metrics were supplied in the response to the pre-assessment questionnaire.

Quality Control Measurements for Crash Data

Timeliness	- # days from crash event to receipt for data entry on statewide database = _____ - # days for manual data entry = _____ - # days for upload of electronic data = _____ - % reports entered into the system within 30 days of the crash = _____ % reports aged more than 60 days = _____
Accuracy	- % of crashes "locatable" using roadway location coding method = _99%_ - % VINs that are valid (i.e., match to vehicle record and decode) = _____ - % of interstate motor carriers "matched" in MCMIS = _____ - % crash reports with 1 or more uncorrected "fatal" errors = __0%__ - % crash reports with 2 or more uncorrected "serious, non-fatal" errors = __0%__ - % crash reports with 5 or more uncorrected "minor" errors = __0%__
Completeness	- % LEAs with > 10% unexplained drop in reporting one year to the next = _____ - % LEAs within 5% of "expected" number of crashes each month = _____ - % FARS/MCMIS match = _____
Consistency	- % of time "unknown" code is used in fields with that possible value = _____ - % logical error checks that fail = _____ - % compliance with MMUCC guidelines = _____ (please provide a date and source for this estimate)

The above percentages are for electronic cases only.

The description of an ideal program is provided below for the State's consideration. The provisions of the program are not to be interpreted as formal requirements but rather as best practices gleaned from experience in other states.

- **Automated edit checks/validation rules that ensure entered data falls within the range of acceptable values and is logically consistent between fields.**
  Edit checks are applied when the data are added to the record. Many systems have a two-tiered error classification: (1) critical errors that must be corrected before submission and (2) warnings that may be overridden.

- **Limited State-level correction authority granted to quality control staff working with the statewide crash database to correct obvious errors and omissions without returning the report to the originating officer.**

Obvious errors include minor misspellings, location corrections, and directional values. Obvious omissions include missing values that can be easily obtained from the narrative or diagram.

- **Processes for returning rejected crash reports in place to ensure the efficient transmission of rejected reports between the state-level database and the collecting official as well as tracking resubmission of corrected reports.**
  Placing the responsibility for correcting report errors on the originating officer is a valuable learning tool that reduces future data quality errors.

- **Performance measures tailored to the needs of data managers and address the concerns of data users. Measures can be aggregated for collectors, users, and the State TRCC.**
  The crash data should be timely, accurate, complete, uniform, integrated, and accessible. These attributes should be tracked based on a set of State-established quality control metrics. The measures shown in the *Advisory* are examples of high-level management indicators of quality.

- **Numeric goals for each performance measure established and regularly updated by the State in consultation with users via the TRCC.**

- **Performance reporting that provides specific feedback to each law enforcement agency on the timeliness, accuracy, and completeness of their submissions to the state-wide database relative to applicable State standards.**
  Specific feedback to law enforcement agencies helps them understand the need to improve data quality.

- **Quality control reviews comparing narrative, diagram, and the coded contents of the report considered part of the data acceptance process for the statewide database.**
  Based on experience in other states, as the proportion of reports received electronically increases it is crucial to transition the data entry staff positions to increased quality control functions.

- **Periodic independent sample-based audits conducted for the reports and related database contents for that record.** A random sample of reports is selected for review. The resulting reviews are also used to generate new training content and data collection manuals, update the validation rules, and prompt form revisions. At a minimum, these audits occur on an annual basis.

- **Periodic comparative and trend analyses used to identify unexplained differences in the data across years and jurisdictions.**
  At a minimum, these analyses occur on an annual basis.

- **Data quality feedback from key users regularly communicated to data collectors and data managers.**
  This feedback will include corrections to existing records as well as comments relating to frequently occurring errors. Data managers disseminate this information to law enforcement officers as appropriate.

- **Data quality management reports provided to the State TRCC for regular review.**
  The TRCC uses the reports to identify problems and develop countermeasures.

Recommendations:

- ❑ Finalize and approve the draft Business Plan and monitor its completion. Implement the projects with merit and provide operational support and funding.

- ❑ Establish a position for a full time manager of the crash data improvement process. The individual selected should be empowered to implement the Business Plan – working with partners responsible for each of the projects and promoting the plan throughout the State and especially among law enforcement.

- ❑ Establish a centralized crash database that includes all fields from the crash report form as the custodial record in the State. Criteria for access to sensitive data should be determined by the TRCC with input from representatives from all system components.

- ❑ Develop a scanned image archive for all crash reports (paper and electronic) to enable long-term storage for search and retrieval to support safety analyses.

- ❑ Implement the Business Plan components related to ConnDOT's improved methods for location coding as planned for the digital roadway network/base map project.

- ❑ Reduce the backlog as proposed in the Business Plan.

- ❑ Ensure that all law enforcement agencies electronic data collection systems incorporate a standard set of edit checks so that data submitted to the centralized crash records system meet a minimum quality standard.

- ❑ Establish a formal comprehensive data quality management program. This program should include a complete set of data quality measurements covering each of the attributes of timeliness, accuracy, completeness, consistency, integration, and accessibility. The program should also include formal processes for monitoring timeliness, accuracy, and completeness with specific feedback to individual law enforcement agencies.

- ❑ Plan for transitioning the ConnDOT crash data entry staff to a quality assurance role. This plan should be based on the findings and conclusions of the project as defined in the Business Plan.

- ❑ Develop a detailed plan for field collection of electronic crash data as defined in the Business Plan. Issues to be considered in the plan are:
  - Technical readiness of law enforcement.
  - Development of data edits to improve data accuracy.
  - Evaluation and selection of e-crash software.
  - Laptop computers or handheld units in all law enforcement units with a traffic enforcement role.
  - Software licenses for electronic crash field reporting software.
  - Training.
  - Implementation of system deployment considering prioritizing law enforcement agencies using some clear criterion such as number of crash reports submitted per year and/or the capabilities of individual agencies to use field software and hardware.

- ❑ Develop a detailed plan for the implementation of the MMUCC compliant PR-1as defined in the Business Plan. The plan should consider policy and procedures, training of all law enforcement, an updated database design, new data entry screens, and an evaluation of data quality (accuracy, completeness, and consistency).

- ❑ Enhance the user-oriented data query tool accessible via the Internet as defined in the Business Plan. This recommendation may be accomplished within the UConn website. A public-access version of the crash data (from which personal information has been redacted) should be accessible for analysis using the new tool.

- ❑ Conduct a formal evaluation of the new PR-1 and the new centralized crash database for their conformance to MMUCC.

2-B: Roadway Data Component

Advisory Excerpt:

- ❑ *Description and Contents.*
  Roadway information includes roadway location, identification, and classification, as well as a description of a road's total physical characteristics and usage. These attributes should be tied to a location reference system. Linked safety and roadway information are valuable components that support a State's construction and maintenance program development. This roadway information should be available for all public roadways, including local roads.

  The State Department of Transportation (DOT) typically has custodial responsibility for the Roadway Data Component. This component should include various enterprise-related files such as:

  - *Roadway Inventories*
    - *Pavement*
    - *Bridges*
    - *Intersections*
  - *Roadside Appurtenances*
    - *Traffic Control Devices (TCD)*
    - *Guard Rails*
    - *Barriers*
  - *Traffic*
    - *Vehicle Miles Traveled (VMT)*
    - *Travel by Vehicle Type*
  - *Other*
    - *Geographic Information Systems (GIS)*
    - *Location Reference System (LRS)*
    - *Project Inventories*

- ❑ *Applicable Guidelines*
  The major guideline that pertains to the Roadway Data Component is the HPMS. This provides guidance to the States on standards for sample data collection and reporting for traffic volume counts, inventory, capacity, delay, and pavement management data elements. Guidelines and tools that address roadway data, as well as identifying which of these are expected to have the greatest correlation with crash incidences, should be considered part of this advisory. Examples of these resources are the Highway Safety Manual, Safety Analyst, and the Interactive Highway Safety Design Model. In addition, the American Association of State Highway and Transportation Officials (AASHTO) is developing a series of guides for its Strategic Highway Safety Plan. This multi-year cooperative effort includes guidelines relevant to several TRS components.

- ❑ *Data Dictionary*
  Roadway information should be available for all public roads in the State whether under State or local jurisdiction. The contents of the Roadway Data Component should be well documented, including data definitions for each field, edit checks, and data collection guidelines that match the data definitions. Procedures for collection of traffic data and calculation of vehicle miles traveled (VMT) should be documented as well.

- ❑ *Process Flow*
  The steps from initial event to final entry onto the statewide roadway data system should be documented in process flow diagrams for each file that are part of the Roadway Data Component. The diagrams should be annotated to show the time required to complete each step and to show alternate flows and timelines depending on whether data are submitted in hardcopy or electronically to the statewide system. The process flow diagram should include processes for error correction and error handling (i.e., returning reports to the original source for correction, resubmission, etc.). Process flow diagrams should show all major steps whether accomplished by staff or with automated systems and clearly distinguish between the two.

- ❑ *Interface with Other Traffic Records System Components*
  A location reference system should be used to link the various components of roadway information as well as other TRS information sources, especially crash information, for analytical purposes. Compatible location coding methodologies should apply to all roadways, whether State or locally maintained. When using a GIS, translations should be automatic between legacy location codes and geographic coordinates. This process should be well

established and documented. Compatible levels of resolution for location coding for crashes and various roadway characteristics should support meaningful analysis of these data.

- *Quality Control Program*
  The roadway data should be timely, accurate, complete, and consistent and these attributes should be tracked based on a set of established quality control metrics. The overall quality of the roadway data should be assured based on a formal program of error and edit checking as the data are entered into the statewide system and procedures should be in place for addressing the detected errors. In addition, the custodial agency and the TRCC should frequently work together to establish and review the sufficiency of the quality control program and to review the results of the quality control measurements. The roadway data managers should receive periodic data quality reports. There should be procedures in place for sharing the information with data collectors through individual and agency-level feedback, as well as training and changes to the applicable instruction manuals, edit checks, and roadway data dictionary. Audits and validation checks should be conducted as part of the quality control program to assure the accuracy of specific critical data elements. Example measurements are shown in Table 5.

Table 5: Examples of Quality Control Measurements for Roadway Data

Timeliness	- *% of traffic counts conducted each year* - *# days from crash event to location coding of crashes* - *# days from construction completion to roadway file update*
Accuracy	- *% of crashes locatable using roadway location coding method* - *% errors found during data audits of critical data elements*
Completeness	- *% traffic data based on actual counts no more than 3 years old* - *% public roadways listed in the inventory*

The measures in Table 5 are examples of high-level management indicators of quality. The managers of individual roadway files should have access to a greater number of measures. The custodial agency should be prepared to present a standard set of summary measures to the TRCC monthly or quarterly.

2-B: Roadway Data Component Status

Transportation officials in Connecticut are responsible for the management and maintenance of the 21,390 mile public road system and the safety of the motoring public using the system. Connecticut's transportation officials, like many of their counterparts throughout the country, face a difficult challenge in maintaining the State's highway infrastructure. An American Society of Civil Engineers report in 2008 described the condition of Connecticut's highway infrastructure as:

- 47 percent of Connecticut's major roads are in poor or mediocre condition.
- 58 percent of Connecticut's major urban highways are congested.
- Vehicle travel on Connecticut's highways increased by 22% from 1990 to 2007.
- 35 percent of Connecticut's bridges are structurally deficient or functionally obsolete.

A core principle of managing these vast roadway infrastructure assets is to make resource allocation decisions based on quality information. The merits of different options with respect to an agency's policy goals are evaluated using credible and current data. The Connecticut Department of Transportation (ConnDOT) uses the Department's information systems to make informed decisions regarding resource allocation to achieve its mission in providing mobility and safety to the motoring public on the State's highway system: 3,719 miles. Two primary information systems used by ConnDOT for this purpose are the Roadway Inventory System (RIS) and the Accident History File (AHF).

The local road system comprises 17,287 miles of public roads. These roads are the responsibility of the 169 local municipalities and the Metropolitan Planning Organizations (MPO). They rely on data from State information systems to manage their roadway assets.

Making informed decisions on matters affecting highway safety is also a difficult challenge for most State transportation officials because it requires an understanding of how safety is affected by the geometric design of the roadway, selection and placement of roadside hardware, use of traffic control devices, size and performance capabilities of vehicles, and needs and abilities of users. This understanding can be developed only through sound analysis of information on crashes, enforcement efforts, driver characteristics, roadway geometrics, traffic control devices, traffic volume data, and the location of roadside hardware and obstacles. It is important, therefore, that these data be available in a timely manner in computerized files and be easily linked so that data can be assembled rapidly and prepared for analysis.

ConnDOT has custodial responsibility for the RIS and the AHF. These two data sources provide the informational support for the Department's major roadway safety countermeasure programs. Among these are:

- The Highway Safety Improvement Program (HSIP)
- The High Risk Rural Roads Program (HRRRP)
- The Rail Highway Grade Crossing Program (RHGCP)

- The Local Road Accident Reduction Program (LRARP)

The RIS contains roadway features such as lane width, shoulder width and type, median width and barriers, intersection type, traffic control type (signals, signs and markings), turn lanes, and traffic counts. The RIS uses a route-mile post location reference system (LRS) to identify the location of various features and characteristics on the roadway.

The AHF contains data from all police reported crashes (PR-1). Electronically collected crash reports by the Connecticut State Police (CSP) capture all data fields on the PR-1 and are transmitted to the University of Connecticut (UConn) where they are entered into the Crash Data Repository (CDR). The CDR is a crash database being developed by UConn under a highway safety grant from ConnDOT's Highway Safety Office (HSO). The Connecticut CDR is a web tool designed to provide access to select crash information collected by state and local police. This data repository enables users to query, analyze and print/export the data for research and informational purposes. The CDR is comprised of crash data from two separate sources: the Department of Public Safety (DPS) and the Connecticut Department of Transportation (ConnDOT).

The purpose of the CDR is to provide members of the traffic-safety community with timely, accurate, complete and uniform crash data. The CDR allows for complex queries of both datasets such as, by date, route, route class, collision type, injury severity, etc. For further analysis, these data can be summarized by user-defined categories to help identify trends or patterns in the crash data.

The ConnDOT Bureau of Policy and Planning is the recipient of crash reports submitted for data entry. However, it only captures a subset of the data fields on the PR-1 before being transmitted to the CDR. The CDR is user-friendly for data extracts by state and local safety stakeholders. The CDR is now the preferred file used by local safety stakeholders. A major shortcoming of the CDR is a data entry backlog of almost 14 months and the incomplete records due to the limited number of captured data fields.

Local transportation officials, in particular MPO officials, request *Local Road High Frequency Accident Locations* from ConnDOT's Bureau of Policy and Planning. Lists are sent out to towns to assist in developing projects under the state Local Road Accident Reduction Program. Submitted projects are then ranked based on number of crashes and severity. Data from crash records must be translated into a format that can be sorted and geocoded, which can be labor-intensive, since it involves transferring the data into a spreadsheet or database. Sorting may be done for crashes on state roads through the Traffic Accident Viewing System program, but output is limited to hard copies or PDF. MPO officials expressed no problems in obtaining available data from ConnDOT.

Both the roadway and crash files contain shortcomings that impede credible analysis toward problem identification and countermeasure development by safety officials at the State and local levels. The RIS is cumbersome to users for *ad hoc* queries since they must request the reports from the Department's Office of Information Systems. The RIS is presently under review and

evaluation by ConnDOT. The timeliness, completeness and accuracy (especially location data) of crash data is questionable.

However, a Draft *Law Enforcement Data Improvement Business Plan* under review by ConnDOT safety officials outlines a method for managing major safety projects envisioned by ConnDOT toward successful completion that will greatly enhance the ability of all safety stakeholders to develop and implement effective safety projects. The plan includes projects that emphasize efficiencies in crash reporting through electronic data collection and roadway data organization through digitized roadway networks and iterative data retrieval techniques for use by highway safety users. As stated in the plan, "One over-arching Business Plan that incorporates all of the various projects into one coherent and well sequenced set of timelines, milestones, and deliverables is the best way for ConnDOT to ensure success. The Business Plan will help the State attract funding (from USDOT and other sources). It will also enable stakeholders throughout government to monitor and promote the key projects that are incorporated into the plan."

The Digital Roadway Network (DRN) will create a "dual-centerline" roadway network (digital map) for divided highways. For state routes, there will be a single centerline. For roads currently only coded in the logged direction, the DRN will also establish reverse mile logs.

This project will give the state a highly detailed, highly accurate location coding method that could be used to integrate all roadway features and spatially codable events (e.g., crashes, citations, etc.) that happen on the roadways. The DRN will be beyond a simple shared base map, but serves that need as well – a way to locate spatially any event and then be able to link the data about that event with any other source of data that has been located on the same network. At present, the interstates have been completed and that portion of the network is ready for use. Over time, the remaining state-maintained roads will be added to the digital network in sequence.

UConn is exploring the potential of using the major provisions of the *Highway Safety Manual (HSM*) that incorporates safety analysis software to identify problems and predict potential remedies. The *HSM* provides an opportunity to consider safety quantitatively along with other typical transportation performance measures. The *HSM* can be used for projects that are focused specifically on responding to safety-related questions. In addition, the *HSM* can be used to conduct quantitative safety analyses on projects that have not traditionally included this type of analysis, such as corridor studies to identify capacity improvements and intersection studies to identify alternative forms of traffic control. The *HSM* can also be used to add quantitative safety analyses to multidisciplinary transportation projects.

Applicable Guidelines

The Highway Performance Monitoring System (HPMS) is the national guideline adopted by ConnDOT for the RIS. If UConn finds that the analytic safety software tools recommended in the *HSM* are beneficial to ConnDOT and the State's highway safety community in general, these safety tools will require the collection of additional roadway features data and adherence to data requirements for use with these analytic safety software tools. ConnDOT should then review the data elements suggested in the Model Inventory of Roadway Elements (MIRE) guideline, and

especially the Fundamental Data Elements (FDE). The FDE are the basic set of elements an agency would need in order to conduct effective enhanced safety analysis. These are based on the elements needed to apply *HSM* roadway safety management procedures using network screening analytical tools (such as SafetyAnalyst), and are a subset of MIRE, and duplicate many of the elements that States already collect for the HPMS on the full extent of Federal-aid roadways.

Data Dictionary
The ConnDOT maintains a data dictionary for the RIS.

Process Flow
Process flow diagrams are maintained for the various road files that comprise the roadway information database. They are included with the RIS Technical Manual.

Interface with other Traffic Records System Components
Datasets of roadway characteristics from the RIS are merged with crash data from the AHF to generate reports for highway safety analysis and development of safety improvement projects. The CDR pilot project at UConn is exploring the interface of several road, crash and driver files for safety analysis and highway safety research.

Quality Control Program
Edit checks in the RIS provide the basic quality control. On-site surveys are conducted periodically to verify roadway features and characteristics.

Recommendations:

- Expedite the implementation of the Digital Roadway Network for both the State and local road system.

- Expedite the Roadway Inventory System evaluation and set a timeline for a major upgrade to facilitate ease of access by Department personnel with direct query capabilities.

- Designate the Crash Data Repository at the University of Connecticut as the State's official crash file. However, custodial responsibility should be retained by Connecticut Department of Transportation with tight oversight accountability.

2-C: Driver Data Component

Advisory Excerpt:

- *Description and Contents*
  Driver information should include data about the State's population of licensed drivers, as well as data about convicted traffic violators who are not licensed in that State. Information about persons licensed by the State should include: personal identification, driver license number, type of license, license status, driver restrictions, convictions for traffic violations in this State and the history of convictions for critical violations in prior States, crash history whether or not cited for a violation, driver improvement or control actions, and driver education data.

  Custodial responsibility for the Driver Data Component usually resides in a State Department or Division of Motor Vehicles. Some commercial vehicle operator-related functions may be handled separately from the primary custodial responsibility for driver data. The structure of driver databases should be typically oriented to individual customers.

- *Applicable Guidelines*
  The ANSI D-20 standard should be used to develop data definitions for traffic records-related information in the driver and vehicle files. Driver information should be maintained to accommodate information obtained through interaction with the NDR via the PDPS and the CDLIS. This enables the State to maintain complete driving histories and prevent drivers from circumventing driver control actions and obtaining multiple licenses. Data exchange for PDPS and CDLIS should be accomplished using the American Association of Motor Vehicle Administrators (AAMVA) Code Dictionary. Security and personal information verification should be in accordance with the provisions of the Real ID act.

- *Data Dictionary*
  At a minimum, driver information should be available for all licensed drivers in the State and for all drivers convicted of a serious traffic violation (regardless of where or whether the person is licensed). The contents of the driver data files should be well documented with data definitions for each field, and where applicable, edit checks and data collection guidelines that match the data definitions. Procedures for collecting, reporting and posting of license, conviction, and license sanction information should be documented.

- *Process Flow*
  The steps, from initial event (licensure, traffic violation, etc.) to final entry onto the statewide driver and vehicle data files, should be documented in process flow diagrams for each file that is part of the Driver Data Component. The diagram should be annotated to show the time required to complete each step and to show alternate flows and timelines depending on whether the data are submitted in hardcopy or electronically to the statewide system. The process flow diagram should include processes for error correction and error handling (i.e., returning reports to the original source for correction, resubmission, etc.). The process flow should also document the timing, conditions, and procedures for purging records from the driver files. Process flow diagrams should show all major steps whether accomplished by staff or automated systems and clearly distinguish between the two. The steps also should be documented in those States that have administrative authority to suspend licenses based on a DUI arrest independent of the judicial processing of those cases.

- *Interface with Other Traffic Records System Components*
  The Driver Data Component should have interfaces (using common linking variables shown in Table 6) to other TRS components such that the following functions can be supported:

  - *Driver component data should be used to verify/validate the person information during data entry in the crash data system and to flag records for possible updating in the driver or vehicle files when a discrepancy is identified. Key variables such as driver license number, name, address, and date of birth should be available to support matching of records among the files. Social Security Numbers should be validated for interstate records exchange.*

  - *Driver and vehicle owner addresses are useful for geographic analyses in conjunction with crash and roadway data components. Linkage in these cases should be based on conversions of addresses to location codes and/or geographic coordinates in order to match the location coding method used in the roadway data component and in the GIS.*

  - *Links between driver convictions and citation/adjudication histories are useful in citation tracking, as well as in systems for tracking specific types of violators (DUI [Driving Under the Influence] tracking systems, for example). Even if a citation tracking system is lacking, there is value in being able to link to data from enforcement or court records on the initial charges in traffic cases. These linkages should be based usually on driver name and driver license number but other identifiers may be used as well. The National Center for State Courts (NCSC) is looking for these identifiers in addition to methods to improve data sharing. "NCSC offers solutions that enhance court*

operations with the latest technology; collects and interprets the latest data on court operations nationwide; and provides information on proven best practices for improving court operations." (http://www.ncsconline.org/)

- *Linkage to injury surveillance data should be possible either directly or through probabilistic linkage in order to support analysis of crash outcomes and crash risk associated with specific driver characteristics (e.g., the driver's history of violations or crash involvement). Key variables should include names, date of birth, dates, times, and locations of crashes and citations.*

Table 6: Common Linking Variables between Driver And Other Data Components of a Traffic Records System

Driver Linkages to Other Law Enforcement & Court Files	- *Citation Number & Case Number* - *Location (street address, description, coordinates, etc.)* - *Personal ID (name, address, DL number, date of birth, etc.)*
Driver Linkages to Roadway Information	- *Driver Addresses (location code, coordinates)*
Driver Linkages to Crash Information	- *Driver License Number* - *Personal Identifiers (name, address, date of birth, etc.)*
Driver Linkages to Statewide Injury Surveillance System Information	- *Personal Identifiers (where allowed by law)* - *Crash Date, Time, Location*

❑ *Quality Control Program*

The driver data should be timely, accurate, complete, and consistent and these attributes should be tracked based on a set of established quality control metrics. The overall quality of the information in the Driver Data Component should be assured based on a formal program of error/edit checking as data are entered into the statewide system and procedures should be in place for addressing the detected errors. In addition, the custodial agency (or agencies) and the TRCC should work together frequently to establish and review the sufficiency of the quality control program and to review the results of the quality control measurements. The driver data managers should receive periodic data quality reports. There should be procedures in place for sharing the information with data collectors through individual and agency-level feedback, as well as through training and changes to the applicable instruction manuals, edit checks, and the driver and vehicle data dictionaries. Audits and validation checks to assure the accuracy of specific critical data elements should be conducted as part of the formal quality control program. Example measurements are presented in Table 7.

Table 7: Examples of Quality Control Measurements for Driver Data

Timeliness	- *Average time to post driver licenses* - *Average time to post convictions after receipt at DMV* - *Average time to forward dispositions from court to DMV*
Accuracy	- *% of duplicate records for individuals* - *% "errors" found during data audits of critical data elements*
Completeness	- *% drivers records checked for drivers moving into the State* - *% of driver records transferred from prior State*
Consistency	- *% of SSN verified online* - *% of immigration documents verified online* - *% violations reported from other States added to driver history*

The measures in Table 7 are examples of high-level management indicators of quality. The managers of individual driver files should have access to a greater number of measures. The custodial agency should be prepared to present a standard set of summary measures to the TRCC monthly or quarterly.

2-C: Driver Data Component Status

The Connecticut Department of Motor Vehicles (DMV) is responsible for the regulation of drivers and related driver services that "promote and advance public safety, security and satisfaction". In 2010, the DMV started its Connecticut Integrated Vehicle and Licensing System (CIVLS) project, a five year, $30 million modernization project to:

- Improve timeliness and responsiveness to Connecticut's citizens, stakeholders and partners;
- Streamline business processes;
- Standardize and integrate business and systems processes;
- Improve operational efficiency; and
- Modernize all agency systems and technology.

The project will be completed in three phases. Release 1 is complete and dealt with infrastructure (hardware, software, environments, network), customer databases, regulated businesses and certain fiscal functions. Release 2 is underway and will focus on motor vehicle registration- and title-related business processes. Release 3 will focus on credential issuance and sanctioning business processes. The end benefits to the CIVLS will be real-time processing, improved customer service, one integrated database and fewer errors.

Description and Contents
The DMV has one operator control system. Every Connecticut resident holding a driver's license, commercial driver's license, learner's permit or identification card is in the database. Commercial Driver Licenses, as well as other types of licenses (motorcycles), are marked and can be queried by license type. Out of state residents with a Connecticut traffic conviction are also included in the driver data file.

All drivers have a nine digit driver's license number. The first few numbers indicate the month and year of birth and the remaining numbers are randomly selected by the licensing system. The license document also includes a bar code (on rear of license) that contains all the driver information that appears on the front of the document. The driver's name and license number are the linkage keys. Law enforcement can submit the license number and retrieve the driver's information and history.

A driver's history is a complete licensing history from the time of initial issuance. All changes in status, renewals, driver education courses or program completions, sanctions and serious convictions in other states are recorded according to current Connecticut law.

Connecticut is a fully compliant Real ID license state that can issue a verified or unverified driver's license. The verified license meets all the Real ID requirements.

The DMV uses facial recognition software and trained document examiners to ensure accurate identification and to reduce fraud. The DMV also uses the Social Security Online Verification,

Systematic Alien Verification for Entitlements and the Problem Driver Pointer Systems (PDPS) on all new and renewal applications.

Applicable Guidelines
The DMV uses the AAMVA Code Dictionary for all convictions and posts them to the driving history as they are received. Connecticut uses PDPS, NDR and CDLIS as part of their licensing, renewal and upgrade processes.

Data Dictionary
The DMV has a data dictionary for its current driver data file and a new dictionary for CIVLS.

Process Flow
A process flow was created as part of the design for the CIVLS project.

Interface with Other Traffic Records System Components
The driver's name and driver's license number are the "linkage keys" for interfacing with other traffic records components.

Law enforcement has access to driver information at a crash scene and when issuing a citation. On e-citations and e-crash reports the driver information auto-populates the forms.

The Connecticut Judicial System, through a Memorandum of Understanding, has electronic access to the DMV driving records (driving history). Generally, this information is accessed by the prosecutors. The Judicial System can also electronically transfer conviction information to the DMV so the driver history can be updated.

The driver file is not linked to Injury Surveillance data.

The driver information is linked to the vehicle data. Individuals registering a motor vehicle must have a driver's license or an identification card. The driver's license number is used to link the information. This information identifies the owner of the vehicle.

Common Linking Variables between Driver and Other Data Components of a Traffic Records System

Driver Linkages to Other Law Enforcement & Court Files	- Citation Number & Case Number - Location (street address, description, coordinates, etc.) - Personal ID (name, address, DL number, date of birth, etc.)
Driver Linkages to Roadway Information	- Driver Addresses (location code, coordinates)
Driver Linkages to Crash Information	- Driver License Number - Personal Identifiers (name, address, date of birth, etc.)
Driver Linkages to Statewide Injury Surveillance System	- Personal Identifiers (where allowed by law) - Crash Date, Time, Location

Information	

Quality Control Program
The DMV has incorporated quality control checks and verification on a routine schedule throughout all its business processes. They are confident that the data are accurate, complete and consistent. Error and edit checks reports are generated weekly.

The following metrics were provided in the pre-assessment questionnaire.

Quality Control Measurements for Driver Data

Timeliness	– Average time from accepted application to create driver record = 15 minute transaction – Average time to mail license to driver from time of application = Issued over the counter now, but will eventually move to a central issuance format - Average time to post convictions after receipt at DMV = if electronic same day, if paper 4 days – Average time from court disposition to receipt at the DMV = Weekly batched and updated on Sunday night
Accuracy	– % of duplicate records for individuals requiring correction = Negligible – Frequency of audits to assure data validity = continuous – % of errors found during audits of critical data elements = negligible
Completeness	– % of records checked for drivers moving into the state = 100% CDLIS/PDPS – % of driver records requested from prior state = all CDL holders – % of driver records received from prior state = all CDL holders
Consistency	– % of SSN verified online = 100% – % of immigration documents verified online = 100% – % non-CDL violations reported from other states added to driver history = All Compact states

When CIVLS is fully implemented, additional quality control measures could be included.

Recommendation:

- ❑ Complete the Connecticut Integrated Vehicle and Licensing System modernization project.

2-D: Vehicle Data Component

Advisory Excerpt:

- *Description and Contents*
  Vehicle information includes information on the identification and ownership of vehicles registered in the State. Data should be available regarding vehicle make, model, year of manufacture, body type, and vehicle history (including odometer readings) in order to produce the information needed to support analysis of vehicle-related factors that may contribute to a State's crash experience. Such analyses would be necessarily restricted to crashes involving in-State registered vehicles only.

  Custodial responsibility for the vehicle data usually resides in a State Department or Division of Motor Vehicles. Some commercial vehicle -related functions may be handled separately from the primary custodial responsibility for all other vehicle data. The structure of vehicle databases is typically oriented to individual "customers."

- *Applicable Guidelines*
  Title and registration information, including stolen and salvage indicators, should be available and shared with other States. The National Motor Vehicle Title Information System (NMVTIS) facilitates such exchanges. In addition, some States empower auto dealers to transact vehicle registrations and title applications following the Business Partner Electronic Vehicle Registration (BPEVR) guidelines from AAMVA. The International Registration Plan (IRP), a reciprocity agreement among U.S States and Canadian provinces, administers the registration processes for interstate commercial vehicles.

- *Data Dictionary*
  Vehicle information should be available for all vehicles registered in the State. The contents of the Vehicle Data Component's files should be well documented, including data definitions for each field, and where applicable, edit checks and data collection guidelines that match the data definitions. Procedures for collection, reporting and posting of registration, title, and title brand information should be documented.

- *Process Flow*
  The steps from initial event (registration, title, etc.) to final entry onto the statewide vehicle data files should be documented in process flow diagrams for each file that is part of this component. The diagram should be annotated to show the time required to complete each step and to show alternate flows and timelines depending on whether the data are submitted in hardcopy or electronically to the statewide system. The process flow diagram should include processes for error correction and error handling (i.e., returning reports to the original source for correction, resubmission, etc.). The process flow should also document the timing, conditions, and procedures for purging records from the vehicle files. Process flow diagrams should show all major steps whether accomplished by staff or automated systems and should clearly distinguish between the two.

- *Interface with Other Traffic Records System Components*
  The Vehicle Data Component has interfaces (using common linking variables shown in Table 8) to other TRS components such that the following functions should be supported:

  - *Vehicle data should be used to verify/validate the vehicle information during data entry in the crash data system, and to flag records for possible updating in the vehicle files when a discrepancy is identified. Key variables such as VIN, license plate number, names, and addresses should be available to support matching of records among the files.*
  - *Vehicle owner addresses are useful in geographic analyses in conjunction with crash and roadway data. Linkage in these cases should be based on conversions of addresses to location codes and/or geographic coordinates in order to match the location coding method used in the Roadway Data Component and in the GIS.*
  - *As with crash data, linkage to injury surveillance data should be possible either directly or through probabilistic linkage in order to support analysis of crash outcomes and crash risk associated with specific driver characteristics (e.g., the driver's history of violations or crash involvement). Key variables should include names and dates, date of birth, times, and locations of crashes.*

Table 8: Common Linking Variables between Vehicle And Other Data Components of a Traffic Records System

Vehicle Linkages to Other Law Enforcement & Court Files	- *Location (street address, description, coordinates, etc.)* - *Personal ID (name, address, DL number, etc.)*
Vehicle Linkages to Roadway Information	- *Owner Addresses (location code, coordinates)*
Vehicle Linkages to Crash Information	- *Vehicle Identification Number* - *Personal Identifiers (name, address, date of birth, etc.)*
Vehicle Linkages to Statewide Injury Surveillance System Information	- *Personal Identifiers (where allowed by law)* - *Crash Date, Time, Location*

- *Quality Control Program*

  The vehicle data should be timely, accurate, complete, and consistent and these attributes should be tracked based on a set of established quality control metrics. The overall quality of the vehicle data should be assured based on a formal program of error/edit checking as the data are entered into the statewide system and procedures should be in place for addressing the detected errors. In addition, the custodial agency (or agencies) and the TRCC should work together frequently to establish and review the sufficiency of the quality control program and to review the results of the quality control measurements. The vehicle data managers should receive periodic data quality reports. There should be procedures in place for sharing the information with data collectors through individual and agency-level feedback, as well as training and changes to the applicable instruction manuals, edit checks, and the driver and vehicle data dictionaries. Audits and validation checks should be conducted to assure the accuracy of specific critical data elements as part of the formal Quality Control Program. Example measurements are presented in Table 9.

Table 9: Examples of Quality Control Measurements for Vehicle Data

Timeliness	- *Average time for DMV to post title transactions* - *% title transactions posted within a day of receipt*
Accuracy	- *% of duplicate records for individuals* - *% errors found during data audits of critical data elements* - *% VINs successfully validated with VIN checking software*
Completeness	- *% of records with complete owner name and address*

The measures in Table 9 are examples of high-level management indicators of quality. The managers of individual vehicle files should have access to a greater number of measures. The custodial agency should be prepared to present a standard set of summary measures to the TRCC monthly or quarterly.

2-D: Vehicle Data Component Status

The Connecticut Department of Motor Vehicles (DMV) is responsible for the regulation of motor vehicles and related vehicle services that "promote and advance public safety, security and satisfaction". In 2010, the DMV started its Connecticut Integrated Vehicle and Licensing System (CIVLS) project, a five year, $30 million modernization project to:

- Improve timeliness and responsiveness to Connecticut's citizens, stakeholders and partners;
- Streamline business processes;
- Standardize and integrate business and systems processes;
- Improve operational efficiency; and
- Modernize all agency systems and technology.

The project will be completed in three phases. Release 1 is completed and dealt with infrastructure (hardware, software, environments, network), customer database, regulated businesses and certain fiscal functions. Release 2 is underway and will focus on motor vehicle registration and title related business processes. Release 3 will focus on credential issuance and the sanctioning business processes. The end benefits to the CIVLS will be real time processing, improved customer service, one integrated database and fewer errors.

Description and Contents
CIVLS Release 2, which addresses vehicle titling and registration business rules and practices, is currently underway. All existing business rules, practices and processes remain in effect and are acceptable practices within the guidelines of the *Advisory*.

The vehicle and driver data files will be integrated under CIVLS. Everyone registering a vehicle as an owner must have either a driver's license or identification card. The owner's name and driver's license number are the linking keys. A vehicle record may contain multiple addresses. The DMV can include an address where the vehicle resides or is garaged, but the owner's address is the official address of record.

The DMV uses POLK software to extract vehicle characteristics from the VIN number. The CIVLS project is identifying ways to reduce or eliminate keystrokes for recording the VIN number on the vehicle data file.

Applicable Guidelines
The DMV uses the National Motor Vehicle Title Information System (NMVTIS) and the International Registration Plan (IRP) in their vehicle registration process. Both processes are now batched backroom procedures. Under CIVLS, these processes will be moved to an "up front" registration procedure with the DMV counter agent completing the task.

Automobile dealers are licensed by the DMV and may register vehicles. The dealers are required to follow the same registration procedures as the DMV.

Data Dictionary
Release 2 of the CIVLS is not complete; however, a revised and up to date data dictionary has been developed.

Process Flow
A revised and up to date process flow will be available when CIVLS is completed.

Interface with Other Traffic Records System Components
The current vehicle data files are accessible by other traffic records system components. The same will be true with CIVLS. Currently, law enforcement, the judicial system and other agencies and organizations with Memoranda of Understanding with the DMV have access to the vehicle information. There are no interfaces with files other than the driver file.

Common Linking Variables between Vehicle and Other Data Components of a Traffic Records System

Vehicle Linkages to Other Law Enforcement & Court Files	- Location (street address, description, coordinates, etc.) - Personal ID (name, address, DL number, etc.)
Vehicle Linkages to Roadway Information	- Owner Addresses (location code, coordinates)
Vehicle Linkages to Crash Information	- Vehicle Identification Number - Personal Identifiers (name, address, date of birth, etc.)
Vehicle Linkages to Statewide Injury Surveillance System Information	- Personal Identifiers (where allowed by law) - Crash Date, Time, Location

Quality Control
The current quality control process for vehicles does weekly checks on edits and errors. A report is generated from the process. CIVLS will continue to have periodic error and edit checks as well as provide the capability for ad hoc reports. The DMV plans to incorporate POLK, NMVTIS, National Automobile Dealers Association and Help IT into the quality control process.

Quality Control Measurements for Vehicle Data

Timeliness	– Average time to post registrations = _Real time___ – Average time to process title documents = __At counter___ – Average time to produce completed titles = __24 hours___ – % title brands posted with 24 hours of receipt = _100%____ – % registrations and title brands posted within 24 hours = __100%___
Accuracy	– % of duplicate records for individuals = __0___ – % "errors" found during data audits of critical data elements = __0___ – % VINs successfully validated with VIN checking software = ___If 17 character VIN is supplied it should be 100%__
Completeness	– % of records with complete owner name and address = __100%___

Recommendation:

- ❑ Complete the Connecticut Integrated Vehicle and Licensing System modernization project.

2-E: Citation/Adjudication Data Component

Advisory Excerpt:

- ❑ *Description and Contents*
  Information, which identifies arrest and adjudication activity of the State, should be available, including information that tracks a citation from the time of its distribution to a law enforcement officer, through its issuance to an offender, its disposition, and the posting of conviction in the driver history database. Case management systems, law enforcement records systems, and DMV driver history systems should share information to support:

  - *citation tracking*
  - *case tracking*
  - *disposition reporting*
  - *specialized tracking systems for specific types of violators (e.g., DUI tracking systems)*

  Information should be available to identify the type of violation, location, date and time, the enforcement agency, court of jurisdiction, and final disposition. Similar information for warnings and other motor vehicle incidents that would reflect enforcement activity are also useful for highway safety purposes and should be available at the local level.

  The information should be used in determining the level of enforcement activity in the State, for accounting and controlling of citation forms, and for detailed monitoring of court activity regarding the disposition of traffic cases.

  Custodial responsibility for the multiple systems that make up the Citation/ Adjudication Data Component should be shared among local and State agencies, with law enforcement, courts, and the Department of Motor Vehicles (DMV) sharing responsibility for some files (e.g., portions of the citation tracking system). State-level agencies should have responsibility for managing the law enforcement information network (e.g., a criminal justice information agency), for coordinating and promoting court case management technology (e.g., an administrative arm of the State Supreme Court), and for assuring that convictions are forwarded to the DMV and actually posted to the drivers' histories (e.g., the court records custodian and the DMV).

- ❑ *Applicable Guidelines*
  Data definitions should meet the standards for national law enforcement and court systems. Applicable guidelines are defined for law enforcement data in:

  - *National Crime Information Center (NCIC)*
  - *Uniform Crime Reporting (UCR)*
  - *National Incident-Based Reporting System (NIBRS)*
  - *National Law Enforcement Telecommunication System (NLETS)*
  - *Law Enforcement Information Network (LEIN)*
  - *Traffic Court Case Management Systems Functional Requirement Standards*

  Applicable guidelines should be defined for court records in the National Center for State Courts (NCSC), and jointly for courts and law enforcement in the GJXDM (with specific Traffic Processing Standards created through a national committee). Tracking systems for citations (i.e., a citation tracking system) and for specific classes of violators (e.g., a DUI tracking system) should meet the specifications for such systems published by NHTSA.

- ❑ *Data Dictionary*
  The citation/adjudication data files should be well documented, including data definitions for each field and where applicable, edit checks and data collection guidelines that match the data definitions. Procedures for collection, reporting and posting of license, registration, conviction, and title brand information should be documented.

  Law enforcement personnel should receive adequate training at the academy and during periodic refreshers to ensure they know the purpose and uses for the data. Training also should ensure that officers know how to access information on violators and process citations and arrests properly. The training manual should be available to all law enforcement personnel and the instructions should match, as appropriate, the edit checks that are performed on the data prior to its being added to the local records management system and statewide databases. The edit checks should be documented and both common and serious errors in the data should be flagged, including missing or out-

of-range values and logical inconsistencies. The data element definitions and system edits should be shared with all collectors, managers, and users in the form of a data dictionary that is consistent with the training manual and the crash report form. Court case management systems and tracking systems (citation tracking and DUI tracking) should be well documented to include definitions of all data elements and corresponding edit checks to ensure accuracy.

- *Process Flow*
  The processing of traffic violations, citations, arrests, and court cases should be documented in a series of flow diagrams showing the typical procedures and their average time to completion for each step. The administrative handling of payment in lieu of court appearance should be shown separately from those violations that are not handled administratively. The processes for detecting drugs or collecting blood alcohol concentration (BAC) values through various methods (breath test, blood or urine tests) should also be documented. The processes for tracking DUI cases in a DUI tracking system should also be included in the set of process flow diagrams. Processes for paper and electronic filing and reporting should be shown separately. Process flow diagrams should show all major steps whether accomplished by staff or automated systems and clearly distinguish between the two.

- *Interface with other traffic records system components*
  NCIC, GJXDM, NIBRS, LEIN, and NLETS guidelines all define methods and data standards for information transfer and sharing at the State and national level. Typically, there are State-level equivalents of the various networks and standards governing the sharing of law enforcement and court-related data. For the purposes of safety analysis at a State and local level, linkage between the Citation/Adjudication Data Component and other components of the TRS is important because it is useful for analyzing the geographic distribution of traffic violations and incidents, as well as monitoring the effectiveness of countermeasures that involve enforcement or court processes. It also enables the creation and updating of adverse driver histories for the purpose of driver control. Key linkages within the TRS for citation/adjudication information are listed in Table 10.

Table 10: Common Linking Variables between Citation/Adjudication and Other Data Components of a Traffic Records System

Citation/Adjudication Linkages to Other Law Enforcement Files and Tracking Systems	- *Computer Aided Dispatch (CAD) Record Number* - *Citation/Arrest/Incident Number, Court Case Number* - *Location (street address, description, coordinates, etc.)* - *Personal ID (name, address, DL number, etc.)*
Citation/Adjudication Linkages to Driver/Vehicle Files	- *Driver and Owner Names, Driver License Number* - *Driver & Owner Addresses (location code, coordinates)* - *Vehicle Plate Number, VIN*
Citation/Adjudication Linkages to Statewide Injury Surveillance System Information	- *Personal Identifiers (where allowed by law)* - *Crash-Related Citation/Arrest Date, Time, Location*

- *Quality Control Program*
  The citation/adjudication data should be timely, accurate, complete, and consistent and these attributes should be tracked based on a set of established quality control metrics. The overall quality of the citation/adjudication data should be assured based on a formal program of error/edit checking as the data are entered into the statewide system, and procedures should be in place for addressing the detected errors. In addition, the custodial agency (agencies) and the TRCC should frequently work together to establish and review the sufficiency of the quality control program and to review the results of the quality control measurements. The data managers receive regular, periodic data quality reports. There should be procedures in place for sharing the information with data collectors through individual and agency-level feedback as well as training and changes to the applicable instruction manuals, edit checks, and the driver and vehicle data dictionaries. Audits and validation checks should be conducted to assure the accuracy of specific critical data elements as part of the formal Quality Control Program. Example measurements are presented in Table 11.

Table 11: Examples of Quality Control Measurements for Citation/Adjudication Data

Timeliness	- *Average time for citations to be sent from LEAs to courts* - *Average time for convictions to be sent to DMV*
Accuracy	- *% errors found during data audits of critical data elements* - *% violations narratives that match the proper State statute*
Completeness	- *% of cases with both original charges and dispositions in citation tracking system*
Consistency	- *% traffic citations statewide written on a single uniform citation*

The measures in Table 11 are examples of high-level management indicators of quality. The managers of individual citation/adjudication files should have access to a greater number of measures. The custodial agency should be prepared to present a standard set of summary measures to the TRCC monthly or quarterly.

2-E: Citation/Adjudication Data Component Status

Paper Citations

Connecticut uses two uniform citation forms for traffic violations. For less serious traffic violations (those that are payable without a court appearance), an infraction form known as a *Traffic Complaint Form* is used. For more serious misdemeanor charges (requiring a court appearance) a form known as the *Motor Vehicle Misdemeanor Summons* is used. The content of both forms is managed by the Administrative Office of Courts (AOC).

The AOC provides the accountability capability for the infraction and summons citation process, issuing citations with unique numbers and accounting for voided or missing citations. While elements of a "cradle-to-grave" accountability process exist, these elements reside in different systems and would be difficult to access for accountability purposes.

In Fiscal Year 2011, law enforcement issued some 350,070 infractions that were reported to the Centralized Infractions Bureau (CIB). Referred cases are entered into a Case Management System used by CIB. Cases referred to CIB may be paid by mail or online via credit card.

In addition to the traffic cases handled by CIB, the Superior Courts handle cases made via the *Motor Vehicle Misdemeanor Summons* and those cases referred by CIB for failure-to-pay or trial requested. In FY 2009, there were some 201,159 cases referred to one of the 20 Geographical Area (GA) Courts of the Superior Courts. Cases are entered into a centralized system known as the Criminal Motor Vehicle System (CMVS). The CMVS is a separate automated system from the one used by CIB.

All ticket convictions from either system are transmitted electronically to the Department of Motor Vehicles (DMV), which is the agency that maintains the official driver history file in the State. Additionally, traffic dispositions are reported to the issuing law enforcement agency as well as the Connecticut State Police (CSP).

Electronic Citations

CIB has also coordinated the use of electronic citations (infractions only) within the State. In the current electronic process, law enforcement may initiate a traffic stop, create an infraction and provide a copy at roadside to the defendant, and electronically submit the infractions to CIB. Electronically submitted infractions adhere to fields and edits jointly coordinated by Capitol Region Council of Governments (CRCOG), CSP and CIB. Presently, some 10 to 15 percent of CIB's annual infractions are submitted via the electronic citation process.

The CSP has rolled out a vendor-provided electronic citation that is being used by some 15 to 20 percent of the State force. Additional officers will be trained and equipped as funding is available for needed printing equipment. The requirement for printers and printed citations limits selection of printers to more expensive hardware and has delayed a larger roll-out.

CSP's vendor also has an estimated 30 clients in the local law enforcement community that may take advantage of the electronic citation process. These local agencies also face an issue with acquiring the necessary hardware for a roll-out.

CRCOG has also created and provided an electronic citation application to its members.

Applicable Guidelines
Connecticut is following applicable national guidelines.

Data Dictionary
An XML schema for electronic citations is available from the Judicial Branch IT Section.

Process Flow
A flow chart of the traffic citation process was provided by the CIB. Additionally, the CSP documented the process of issuing Operating Under the Influence (OUI) citations.

Interface with other Components of the Traffic Records System
The Judicial Branch interfaces electronically with those law enforcement agencies submitting electronic citations and in the reporting of traffic convictions to the DMV.

As a joint project with the Department of Motor Vehicles and the Judicial Branch, the Connecticut Criminal Justice Information System (CJIS) has deployed a pilot OUI tracking system known as the Connecticut Impaired Driver Records Information System (CIDRIS). CIDRIS will provide automation and electronic exchange of OUI arrest data and documents among local law enforcement, CSP, DMV and the Judicial Branch. The project is currently a pilot involving two Troops of the CSP.

Quality Control Program
Both the CIB and the Superior Courts case management systems provide a quality control process. Errors are followed up with the issuing officers by telephone or e-mail.

Recommendations:

- ❑ Seek a less expensive solution to the purchase of printers in order to encourage large scale adoption by Connecticut State Police and other agencies. Alternately, seek to establish a funding mechanism for the necessary printers and supplies.

- ❑ Establish a TRCC sub-committee to explore and define the process to create electronic versions of the Traffic Warning and the Motor Vehicle Misdemeanor Summons.

- ❑ Take advantage of the data sharing effort being lead by the Connecticut Criminal Justice Information System (CJIS) group. The Connecticut Information Sharing System (CISS), currently being planned by CJIS, offers a structure to further the TRCC's efforts in data sharing. CISS offers the possibility of cooperation in the area of network access, data specifications, user security and privileges and vendor participation.

- Consider adding citation data to the data repository currently being piloted by the University of Connecticut. While this will not provide a "cradle-to-grave" citation repository it will unite the current separate databases maintained by the Centralized Infractions Bureau and the Superior Courts.

2-F: Statewide Injury Surveillance System (SWISS) Data Component

Advisory Excerpt:

- *Description and Contents*
  With the growing interest in injury control programs within the traffic safety, public health, and enforcement communities, there are a number of local, State, and federal initiatives that drive the development of a SWISS. These systems typically incorporate pre-hospital (EMS), trauma, emergency department (ED), hospital in-patient/discharge, rehabilitation and morbidity databases to track injury causes, magnitude, costs, and outcomes. Often, these systems rely upon other components of the TRS to provide information on injury mechanisms or events (e.g., traffic crash reports). The custodial responsibility for various files within the SWISS typically is distributed among several agencies and/or offices within a State Department of Health.

  This system should allow the documentation of information that tracks magnitude, severity, and types of injuries sustained by persons in motor vehicle related crashes. Although traffic crashes cause only a portion of the injuries within any population, they often represent one of the more significant causes of injuries in terms of frequency and cost to the community. The SWISS should support integration of the injury data with police reported traffic crashes and make this information available for analysis to support research, public policy, and decision making.

  The use of these data should be supported through the provision of technical resources to analyze and interpret these data in terms of both the traditional traffic safety data relationships and the specific data relationships unique to the health care community. In turn, the use of the SWISS should be integrated into the injury control programs within traffic safety, and other safety-related programs at the State and local levels.

- *Applicable Guidelines*
  NHTSA has produced the National Emergency Medical Service Information System (NEMSIS) to serve as a guideline for a uniform pre-hospital dataset. It applies to all EMS runs, not just those related to traffic crashes. The American College of Surgeons (ACS) certifies trauma centers and provides guidelines for trauma registry databases and for a National Trauma Databank. Emergency Department and in-patient data guidelines (UB-92) are available from the US Department of Health and Human Services. The National Center for Health Statistics, within the Centers for Disease Control (CDC), sets ICD-9 codes and E-codes for injury morbidity/mortality. These codes are updated as needed and the ICD-10 codes are expected by the fall of 2007. The CDC also sets standards for reporting to their injury database and for use of the Public Health Information Network for data sharing.

- *Data Dictionary*
  The contents of the SWISS Data Component's files should be well documented to include data definitions for each field, and where applicable, edit checks and data collection guidelines that match the data definitions. Procedures should be documented in instruction manuals for collection, reporting, and posting of EMS run data on a uniform run report, uniform data in various hospital and trauma databases, and for tracking morbidity and mortality for each system.

  Training should include (where applicable) data collection, data entry, use of various injury coding systems (ICD and E-codes) as well as injury and trauma severity scoring systems such as the Injury Severity Score (ISS), Revised Trauma Score (RTS), and Abbreviated Injury Score (AIS) scales.

- *Process Flow*
  The information and processes involved in transport and treatment of victims of crash-related injuries should be documented in a series of flow diagrams showing the typical data collection and management processes and their average time to completion for each step in the data flow process. Processes for paper and electronic filing and reporting should be shown separately. Process flow diagrams should show all major steps whether accomplished by staff or automated systems and clearly distinguish between the two.

- *Interface with other Traffic Records System Components*
  Data transfer and sharing between local systems and the SWISS should be governed by data definitions, quality control requirements, and data transfer protocols defined by the custodial agencies. Transfer and sharing between SWISS files and the relevant national databases are governed by the data definitions, quality control requirements, and data transfer protocols for those systems (e.g., National Trauma Database).

  The CODES project is the primary example of data sharing and integration between SWISS and the other components of a TRS. It can take the form of direct linkage using personal identifiers or probabilistic linkage using other data elements such as incident time, date, date of birth, and locations, responding officer/agency, and others. Key linkages within the TRS for SWISS information are listed in Table 12.

Table 12: Common Linking Variables between SWISS And Other Data Components of a Traffic Records System

Linkages Internal to the SWISS data on injury and healthcare treatments/outcomes	- *Patient name* - *Patient ID number* - *EMS run report number* - *Social Security Number*
Linkages between SWISS data and Crash Data	- *Personal Identifiers: Name, address, date of birth (direct linkage)* - *CODES linking variables (probabilistic linkage)* - *EMS run report number* - *Crash Report Number*
Linkages between SWISS data and other (non-Crash) components of the traffic records system	- *Name & SSN linked to driver file (direct linkage)* - *Location/address* - *Event & treatment date and time*

- *Quality Control Program*
  The SWISS data should be timely, accurate, complete, and consistent and these attributes should be tracked based on a set of established quality control metrics. The overall quality of the information in the SWISS Data Component should be assured based on a formal program of error/edit checking as the data are entered into the statewide system and procedures should be in place for addressing the detected errors. In addition, the custodial agency (or agencies) and the TRCC should work together frequently to establish and review the sufficiency of the quality control program and to review the results of the quality control measurements. The data managers should receive periodic data quality reports. There should be procedures in place for sharing the information with data collectors through individual and agency-level feedback, as well as to provide modifications to applicable training and instruction manuals, edit checks, and the SWISS data dictionaries. Audits and validation checks to assure the accuracy of specific critical data elements should be conducted as part of the formal Quality Control Program. Example measurements are presented in Table 13.

Table 13: Examples of Quality Control Measurements for the Statewide Injury Surveillance System

Timeliness	- *Average time for EMS run reports to be sent to governing agency* - *% EMS run repots sent to governing agency in the prescribed time* - *Average time from treatment & discharge from ED to record availability in the ED discharge database* - *Average time from patient discharge to record availability in the hospital discharge database* - *Average time from date of incident to record appearing in the trauma registry* - *# days from death to appearance of record on mortality database*
Accuracy	- *% EMS run locations that match statewide location coding* - *% correct ICD-9 and E-codes* - *% "errors" found during data audits of critical data elements in EMS, ED, trauma registry, hospital discharge, & mortality databases*
Completeness	- *% of traffic crash-related EMS runs in the EMS database* - *% of ED visits for crash-related injuries recorded in ED discharge database.* - *% of trauma cases represented in the trauma registry* - *% of SCI/TBI cases represented in the SCI/TBI registries*
Consistency	- *% correct ICD-9 and E-codes (see also accuracy)* - *CODES match rate (where applicable)* - *% crash-related deaths with motor vehicle crash in cause of death field on death certificate*

The measures in Table 13 are examples of high-level management indicators of quality. The managers of individual medical data files should have access to a greater number of measures. The custodial agencies should be prepared to present standard sets of summary measures to the TRCC monthly or quarterly.

2-F: Statewide Injury Surveillance System (SWISS) Data Component Status

A successful statewide injury surveillance system uses several key components to monitor the incidence of, risk factors for, and costs of fatal and non-fatal injuries. These components are: emergency medical services, acute care, trauma and rehabilitation facilities, and vital records. Oversight for these entities' activities may be governed by local, State, and regional authorities. Data collected by these agencies provides a wealth of patient care, intervention, and prevention information that can be used to evaluate current treatment modalities and injury prevention activities. A comprehensive surveillance system provides crucial healthcare and injury prevention information to local, State, and regional health agencies, providers, and planners.

Integrating injury surveillance with other State traffic records system components benefits all entities. Motor vehicle crash data can supply many of the pre-event and event information for the Haddon Matrix to be used for injury prevention program planning initiated by the public health professionals. Alternatively, providing traffic safety programs and engineers with medical outcomes for motor vehicle crashes enables them to augment their understanding of crash severity beyond the typical five-point scale captured on most crash reports.

Description and Contents

Connecticut has all of the primary components of a comprehensive injury surveillance system; however, some systems are undergoing changes of varying degrees. Some of these components are managed by divisions within the Connecticut State Department of Public Health (DPH), including a pre-hospital data collection system managed by the Office of Emergency Medical Services (OEMS) and vital records data managed by the Office of Vital Records (OVR). Each trauma center manages a trauma registry and submits data to DPH on an annual basis, while hospital emergency department and inpatient discharge data are managed by the Connecticut Hospital Association (CHA) and submitted to DPH Office of Health Care Access (OHCA).

Emergency Medical Services (EMS)

Description and Contents

The OEMS resides in the Department of Public Health. Connecticut is divided into five EMS regions comprised of urban areas and rural regions. Approximately 191 agencies respond to emergency calls in the state of Connecticut, which consists of 169 towns and two tribal regions. There are 107 separate dispatch (9-1-1) centers throughout the State that are not centrally coordinated.

Applicable Guidelines

The OEMS has the responsibility for licensing all EMS service providers and agencies operating in the State, as well as collecting and managing data received from them.

Currently, there is no uniform patient care report (PCR); however, there is a standard set of data elements and attributes that are required by the OEMS. That set of variables is approximately 95 percent compliant with National Emergency Medical Services Information System (NEMSIS) standards.

Data Dictionary
The EMS data dictionary is a work in progress, as noted in EMS Advisory Board meeting minutes from February, 2012. The NEMSIS variables being captured by the State most likely include patient date of birth, incident date, time and location as well as gender and mechanism of injury. Those variables facilitate linkage between traffic records databases; however, it would be ideal to capture the police crash report number or medical record number on the PCR for deterministic linkage purposes.

Process Flow
Connecticut currently collects PCR information through a batch submission process. There are nine software vendors serving the 191 agencies across the State. Those vendor packages submit records to the OEMS database electronically. All PCRs are collected electronically, which is a significant change since 2007. Electronic collection efforts have been aided by traffic records funding from the Section 408 grant. Data submission is a cooperative situation between the provider agencies and OEMS because they do not have funding to support the EMS agencies, which is typically the incentive for compliance with data collection standards.

Connecticut does not currently submit data to the national NEMSIS database.

Interface with other Traffic Records System Components
Representatives from the OEMS are members of the Connecticut TRCC and the CODES Board of Advisors and work closely with other health agencies. EMS data are not integrated as a part of the CODES project because the most recent year of complete data available is 2009 due to the implementation of e-PCR in the recent past. There are plans to link EMS data with crash report and hospital files once all 2010 data are available.

Quality Control
Currently, quality control of EMS records is the responsibility of the OEMS. There is no formal automated quality program in place, but it is thought that each software vendor has incorporated some basic logic and edit checks, at the very least. The State does some checks as the data are compiled and should encourage feedback from all data users as to the completeness and accuracy of the file.

Emergency Department Data and Hospital Discharge Data System

Description and Contents
All hospital emergency department (ED) and inpatient discharge records are collected and maintained by the Office of Health Care Access (OHCA) in the DPH. A total of 31 independent acute care hospitals throughout Connecticut submit records annually.

Applicable Guidelines
Data on ED and inpatient discharges are collected by all State-licensed hospitals and submitted to OHCA according to statutes in Section 10a-654.

All hospital data are collected using the UB04 data standard set forth by the National Uniform Billing Committee and the American Hospital Association.

Data Dictionary
The hospital ED and inpatient data files follow the UB standard and data dictionaries are maintained by OHCA. Data collected include patient demographics, patient ID, name, date of birth, ICD-9 codes, E-codes, hospital charges and payer information. E-codes are required in the hospital data system for hospitalizations with a primary diagnosis ICD-9 code denoting an injury case-codes between 800-959.9. It was reported that hospitals have high levels of compliance with this regulation (see quality metrics below).

Process Flow
Data are collected on all emergency department, inpatient, and outpatient records. Data are entered directly into electronic collection software at each hospital and maintained at that location. CHA Data Services offers the ChimeData program, which includes collection and submission software, edit checks, and data analysis tools. Data from all CHA member hospitals are submitted to CHA, which then transmits that information to OHCA on an annual basis. Non-member hospitals submit data directly to OHCA annually.

Interface with other Traffic Records System Components
Staff from DPH are members of the TRCC and the CODES Board of Advisors; however, CHA is not represented on the TRCC. Hospital emergency department and inpatient discharge data have been used for analytical purposes within the DPH and reports are available on the DPH website. Data are provided to the Connecticut CODES project on an annual basis for linkage with crash report records. The Injury Prevention Program (IPP) produces fact sheets and reports to support traffic safety legislation and conduct problem identification.

Quality Control
No formal data quality metrics/benchmarks have been established. CHA maintains that it performs certain data quality checks and subsequent program-specific quality control is performed by staff members at DPH once the data are received. When errors are discovered, records are returned to CHA or the non-member hospital for correction; this process may happen multiple times with no mention of penalties.

Staff shortages at DPH may hinder the data cleaning process as the personnel assigned to receipt and maintenance of the hospital files also have other duties, making these data not a priority.

The following table was provided in the responses to the pre-assessment questionnaire.

Selected Quality Control Measurements for the Hospital Discharge Data

Timeliness	- Number of days from hospital/ED discharge until data is entered into database	Not available
	- Number of days from end of quarter/year until data is available for analysis on a state level.	~ 1 year
Accuracy	- % "missing" found during data audits of critical data elements	Not available
	- % of hospitals participating in statewide database	100%
Completeness	- % of injury related discharges containing a valid E-Code	94.4%

Trauma Registry

Description and Contents

The DPH collects data from each of the thirteen certified trauma centers in the State and maintains that information in a trauma registry. Other hospitals may treat cases that qualify as trauma according to state guidelines, but that information is not currently captured. Each trauma center is an independent facility and not coordinated on a State level.

Applicable Guidelines

Trauma centers in Connecticut are State-certified and verified by the American College of Surgeons (ACS) into Levels I, II, and III. There are two Level I (adult and pediatric), nine Level II and one Level III centers. All trauma centers are required to submit medical records to the DPH according to Public Health Code 19a-177-1 to 19a-177-9. Each trauma center submits data to the National Trauma Databank (NTDB), but the State does not transmit a file.

Data Dictionary

There is a standard set of variables that all trauma centers are required to submit to the NTDB, but there is no State data dictionary. It is currently in the process of being updated by the Committee on Trauma-Data Committee. The standard variables include patient demographics, medical record number, billing number, encounter number, nature of injury and length of stay but the dataset lacks key variables such as PCR or crash report number. Those variables would facilitate deterministic linkage, but probabilistic linkage is possible using the available demographic and admission information (date, time, location). The dataset available for analysis is de-identified, but variables such as date of birth and facility identifier would enhance the linkage. The trauma registry also captures several injury severity metrics, including ICD-9, AIS and ISS codes. Currently, E-codes are complete and accurate which will contribute to data linkage and analysis.

Process Flow
Trauma records are abstracted from the hospitals' medical record file quarterly and distributed to trauma registrars for entry into trauma registry collection software. The registrars enter the required information into the software (TraumaBase at the trauma center available to the assessment team). All abstracts and data entry are to be completed by the 15th of the month following the admission date, resulting in a 15-45 day delay. Each trauma center submits de-identified data directly to DPH twice per year. Data are maintained at the State level on a Digital Innovations platform, which is a significant advancement since the previous assessment.

Once data are received at DPH, the files may be shared with other trauma centers upon approval and used to create analytical reports.

Interface with other Traffic Records System Components
Staff from the DPH and a representative from a Level I trauma center are members of the Connecticut TRCC and the CODES Board of Advisors. Trauma registry data have not been integrated with other components of the traffic records system, including EMS data which would be an advantage to both systems in the continuum of patient care. Representatives from the trauma community are collaborating with DPH and the CODES program to link records to crash reports and PCRs. This process would be easier if identifiers were supplied as part of the medical record; such permissions should be explored.

Quality Control
The State relies on quality and logic checks built into the software packages at each trauma center and NTDB. Trauma centers do perform quarterly inter-rater reliability testing to increase the accuracy and completeness of their records.

The following table was provided in the responses to the pre-assessment questionnaire.

Selected Quality Control Measurements for the Trauma Registry Data

Timeliness	- Number of days from trauma center discharge until data is entered into database	30-45 days
	- Number of days from end of quarter/year until data is available for analysis on a state level.	180 days
Accuracy	- % "missing" found during data audits of critical data elements	0%
Completeness	- % of injury related discharges containing a valid E-Code	99.86%

Vital Records

Applicable Guidelines
The Office of Vital Records (OVR) in DPH is responsible for maintaining vital records for the State, including all mortality data. OVR gathers information about each death that occurs in the State and on all deaths to residents of the State that occur in other states or countries.

The collection and issuance of vital records in the State is governed by Connecticut General Statute Section 7-42. There is one State Medical Examiner and a Registrar in each of the 169 towns.

Data Dictionary
Connecticut is currently using the US Standard Certificate of Death dataset from the National Center for Health Statistics (NCHS). The certificate is recognized and complies with NCHS standards. The data dictionary for this system was made available to the assessment team and is managed by the OVR.

Information including social security number, date and time-of-death, and cause of death are required on all death certificates. Similar to other states, cause of death information is classified in accordance with the ICD-10 standard and identified by NCHS, leading to 100 percent completeness.

Process Flow
In 2010, an electronic vital records system (EVRS) was implemented, including a module for death certificates. The State Medical Examiner, town coroners, funeral directors, and medical doctors may verify a death and initiate a record. That record is transmitted to the town Registrar, who is responsible for maintaining the original certificate. The Registrar transmits the death record to the OVR electronically for inclusion in the State mortality file. This electronic system is a major improvement from 2007; however, some interviewees expressed hesitation due to its infancy and time delay (see quality metrics below). The time delay was attributed to the acquisition of out-of-state death records for Connecticut residents and final verification of records by NCHS.

Interface with other Traffic Records System Components
Representatives from the OVR work closely with other divisions of DPH and have provided data files to the FARS analyst. These data have also been shared with other health-related systems and the DMV to account for and verify deaths. At this time, mortality data are a piece of the CODES project, but are analyzed independently and not integrated with other files.

Quality Control
Manual quality checks occur at the level of the town Registrar and the EVRS conducts logic and edit checks at the OVR once records are submitted. Additional quality checks are performed by NCHS when the files are submitted for cause of death coding.

The following table was provided in the responses to the pre-assessment questionnaire.

Selected Quality Control Measurements for the Vital Statistics Data – Connecticut State

Timeliness	- Number of days from death discharge until data is entered into database	Not available
	- Number of days from end of quarter/year until data is available for analysis on a state level.	~ 18 months
Accuracy	- % "missing" found during data audits of critical data elements	Not available
Completeness	- % of injury related fatalities containing a valid E-Code	97%

Crash Outcome Data Evaluation System (CODES)

Connecticut has been a part of the CODES program since 1997, with DPH Injury Prevention Program (IPP) managing and conducting the data linkage and analysis for NHTSA.

Within Connecticut, the IPP had a history of working with the hospital ED and inpatient databases before beginning the CODES project. That program currently links police crash (ConnDOT) with hospital ED and inpatient (OHCA) records through probabilistic techniques due to the lack of personal identifiers in the crash file. The most recent year of linked and imputed data in the CODES program is 2009. The first year of EMS data available for linkage was 2009; efforts to integrate EMS data into CODES are being discussed within DPH.

At the end of 2011, the IPP stopped receiving funding from the Centers for Disease Control and Prevention to sustain the Connecticut Injury Surveillance System. That funding source is on a five year cycle, leaving the State without the opportunity to reacquire those funds until 2016. This lack of funding has led to concerns about staff shortages and resource allocation and has called the future of CODES into question. At this time, the DPH is sustaining the program and the possibility of losing such a project should be a critical concern for the traffic safety community. Integration of pre-hospital, crash, and hospital records allows for the analysis of the entire spectrum of the incident from event to first response and triage to injury severity, treatment, and outcome. That wealth of information is valuable and expands the State's capacity for injury surveillance and countermeasure development. As several components of the traffic records ISS become electronic, thus increasing the data timeliness, completeness, and accuracy, integration becomes feasible and successful.

Researchers at the IPP produce a multitude of reports that focus on traffic safety program areas, as well as other public health concerns. Program-specific reports are provided for grant applications and problem identification. CODES analysts have also worked with local health departments and on large research projects with State partners.

The CODES Board of Advisors includes representative from the OEMS (representing EMS and trauma registry), ConnDOT (representing crash reports) and DPH. It was reported that the CODES Board of Advisors has not met in the past year and it was unclear when it would reconvene.

Integrated databases have the ability to supply traffic safety engineers and researchers with a more complete description of the level of injury sustained by persons involved in a motor vehicle crash. This information can be used for problem identification, program evaluation and to help inform decisions about targeted enforcement campaigns and roadway design issues. Similarly, injury surveillance data linked to motor vehicle information can provide public health researchers with access to valuable event information missing in many hospital-based databases. The further inclusion of licensing, registration, citation, and roadway information can provide an invaluable resource for identifying and preventing injuries and deaths associated with motor vehicle crashes.

Recommendations:

- ❑ Continue to support the implementation and maintenance of the State EMS database. Pursue financial means to support the EMS system, such as State budget line items or surcharges on driver licenses, vehicle registrations, or moving violations. Financial stability is critical to the success of this system component.

- ❑ Support current efforts within the trauma community to organize and standardize data collection in the trauma registry. Uniformity is critical to a data system.

- ❑ Explore funding options to support the Injury Surveillance System in the absence of the Centers for Disease Control and Prevention grant. The continuation of the Injury Prevention Program, Crash Outcome Data Evaluation System, and strengthening of the data management staff over EMS, hospital, trauma registry, and mortality data will directly impact the success of the traffic records system.

- ❑ Incorporate CODES analyses in problem identification and program evaluation.

- ❑ Form a standing data integration subcommittee of the TRCC. This committee should be tasked with developing a data inventory and plans for the integration of all traffic records.

APPENDFIX A

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APPENDIX B

Abbreviations and Acronyms

AAAM	Association for the Advancement of Automotive Medicine
AAMVA	American Association of Motor Vehicle Administrators
AASHTO	American Association of State Highway and Transportation Officials
ACS	American College of Surgeons
AIS	Abbreviated Injury Score
ANSI	American National Standards Institute
ATSIP	Association of Transportation Safety Information Professionals
BAC	Blood Alcohol Concentration
BPEVR	Business Partner Electronic Vehicle Registration
CDC	Center for Disease Control
CDLIS	Commercial Driver License Information System
CODES	Crash Outcome Data Evaluation System
DMV	Department of Motor Vehicles
DOT	Department of Transportation
DUI	Driving Under the Influence
ED	Emergency Department
EMS	Emergency Medical Service
FARS	Fatality Analysis Reporting System
FHWA	Federal Highway Administration
GES	General Estimates System
GIS	Geographic Information System
GJXDM	Global Justice XML Data Model
GPS	Global Positioning System
HPMS	Highway Performance Monitoring System
HSO	Highway Safety Office
ICD	Injury Coding System
IRP	International Registration Plan
ISS	Injury Surveillance Score
LEIN	Law Enforcement Information Network

MCMIS	Motor Carrier Management Information System
MMUCC	Model Minimum Uniform Crash Criteria
NCIC	National Crime Information Center
NCSC	National Center for State Courts
NDR	National Driver Registry
NEMSIS	National Emergency Medical Service Information System
NGA	National Governor's Association
NHTSA	National Highway Traffic Safety Administration
NIBRS	National Incident-Based Reporting System
NLETS	National Law Enforcement Telecommunication System
NMVTIS	National Motor Vehicle Title Information System
PDPS	Problem Driver Pointer System
RTS	Revised Trauma Score
SHSP	Strategic Highway Safety Plan
SWISS	Statewide Injury Surveillance System
TCD	Traffic Control Devices
TRCC	Traffic Records Coordinating Committee
TRS	Traffic Records System
UCR	Uniform Crime Reporting
VIN	Vehicle Identification Number
VMT	Vehicle Miles Traveled

TEAM CREDENTIALS

JACK D. BENAC, PROJECT MANAGER

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SUMMARY OF EXPERIENCE

Mr. Benac has over 34 years experience in transportation safety. Mr. Benac's transportation safety career began in the Traffic and Safety Division with the Michigan Department of Transportation where he conducted transportation safety research and was responsible for the development of safety systems. He was team leader in the development of the Michigan Dimensional Accident Surveillance System (MIDAS), Michigan Traffic Sign Inventory System (MTSIS), and Michigan Guardrail Information System. He was the Project Manager in developing MDOT's Safety Status System (SAFESTAT). Mr. Benac worked in the private sector where he was a member of a consultant team developing safety systems for the Ohio Department of Transportation and the Illinois Department of Transportation.

Mr. Benac worked as an instructor at Lansing Community College where he developed course material in traffic technology and taught traffic safety classes.

Mr. Benac was employed with the Michigan Department of Information Technology until 2010 where he was a Project Manager and completed a project to reengineer Michigan's Traffic Crash Reporting System. The project received a ComputerWorld Honors award in 2004 and was recognized as one of five finalists in the Government and Nonprofit category.

Mr. Benac retired from Michigan State Government on December 31, 2010.

EDUCATION

- ❑ Graduate of Ferris State University in Civil Technology 1970.
- ❑ Certificates from Michigan State University in Traffic Simulation Modeling 1985.
- ❑ Certificates from George Washington University in the Management of Information Technology Projects 1999-2001.
- ❑

COMMUNITY

- ❑ President, Lake Victoria Property Owners Association 1981-1989.
- ❑ Community Board of Education from 1989 to 2005.
- ❑ Member of Volunteer Services, Great Lakes Region, International Red Cross 1991-Present

CYNTHIA BURCH, MPH

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University of Maryland Baltimore
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Professional Experience

Ms. Burch has been an epidemiologist at the University of Maryland's National Study Center for Trauma and EMS (NSC) since 2005. Prior to that she was a Research Analyst at the NSC and an epidemiologist at the Governor's Office of Highway Safety in Georgia. She has been working in the fields of injury epidemiology and traffic safety research for close to 10 years. During her career, she has gained considerable experience and understanding in the analysis and use of large datasets relating to motor vehicle crashes and injury. She has co-authored a number of journal articles on highway safety and has presented results from independent research projects at local and national health and injury conferences. She is currently working on the Crash Outcome Data Evaluation System (CODES) and the Crash Injury Research and Engineering Network (CIREN) projects funded by the National Highway Traffic Safety Administration (NHTSA). She also works closely with the Maryland Highway Safety Office and serves on their statewide taskforces.

Organizations

Association of Traffic Safety Information Professionals
Maryland Partnership for Injury Prevention
Maryland Traffic Records Coordinating Committee – Technical Committee

Education

Bachelor of Science, Biology, Emory University	1999
Master of Public Health, Epidemiology	2000

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EDUCATION

Public Administration Bachelors Degree: 1976

Auburn University — Auburn, Alabama

Public Administration Masters: 1980

Auburn University - Montgomery — Montgomery, Alabama

EMPLOYMENT/EXPERIENCE

Consultant

Years Employed: 2004 to 2007

Consultant for various local, national and international organizations.

- Jordon Rule of Law Project – Provided feasibility study to the Ministry of Justice, Jordan on the deployment of document scanning, video hearings and electronic filing.
- 23rd Judicial Circuit – Office of Alternative Sentencing – Provided analysis of local jail overcrowding and methods to reduce inmate population
- 28th Judicial Circuit- SAICS Project – The SAICS project, a federally funded information integration project, contracted for services relating to final project assessment and report preparation.
- Traffic Records Assessment (NHTSA Affiliated) – Traffic Records Assessments for Pennsylvania and New Mexico
- Alabama Department of Economic and Community Affairs (DOJ Affiliated) – Monitoring of Juveniles in Detention for Alabama.
- 10th Judicial Circuit (Birmingham, AL) District Attorney – Automated Case Management System

Administrative Office of Courts

Assistant Administrator Director of courts

Years Employed: 1976 to 2007

During my 29 years at the Administrative Office of Courts, I have had the opportunity to serve in a number of different capacities; both in direct provision of services to the trial courts and in staff positions. Last position held was as the Assistant Administrator Director of Courts. Additionally, directly supervised the MIS division of the trial court operation.

ANDREW S. KRAJEWSKI

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Andrew Krajewski is the Director for Driver Safety at the Maryland Motor Vehicle Administration (MVA) and has over 35 years experience in traffic safety. As Director of Driver Safety, he advises the MVA Executive Team on programs, policies and practices that can improve driver safety on Maryland roadways. Prior to assuming this position, he was the Director for Driver Programs and oversaw the operations of four MVA Divisions: Driver Instructional Services, Driver Services, Administrative Adjudication and Driver Wellness and Safety. Between 1983 and 1998, he served as the Coordinator of the Maryland Motorcycle Safety Program. Before coming to the MVA, he was employed by the Motorcycle Safety Foundation (MSF) as the West Central Regional Director and a Manager in the Education Department.

He has been involved in several traffic safety related research projects including the original Motorcycle Operator Skill Test (MOST) in 1974, the Motorcycle Rider Course Feasibility Study in 1978, the Morgan State University Rider Training Study in 2000, the Maryland On-Road Licensing Skill Test in 2002, and the Effectiveness of Maryland's Graduated Licensing System in 2002 and the American Association of Motor Vehicle Administrators (AAMVA) Field Test of an On-Road Non-commercial Licensing Skill Test in 2010. He was the MVA's project coordinator for a NHTSA Promising Practice Grant that created an on-going data collection system to track everyone involved in motorcycling through rider training, the MVA licensing and vehicle registration processes, crash reports, citations and convictions. This data collection system became operational in February 2010. He is currently involved with Cambridge Systematics on a National Highway Traffic Safety Administration project to evaluate trained and untrained motorcycle operators.

He has served on 18 NHTSA Motorcycle Safety Technical Assessment Teams evaluating program management, licensing and program evaluation and data collection. He has also participated on expert panels to identify the knowledge and skills of a safe motorcyclist, the development of Model Standards for Entry Level Rider Training , development of Model Administrative Standards for State Motorcycle Safety Programs, the revision of the AAMVA Motorcycle Operator's Manual and licensing knowledge test questions and the creation of the AAMVA Guidelines for Motorcycle Licensing. He teaches the Transportation Safety Institute's (TSI) "Motorcycle Program Management Course", serves on Maryland's Traffic Records Coordination Technical Committee and is the Executive Committee Chairperson for the National Association of State Motorcycle Safety Administrators (SMSA) executive committee.

He has a Bachelor of Science (B.S.) degree from Penn State University and a Master of Science (M.S.) from the University of Central Missouri.

JOHN J. ZOGBY, PRESIDENT

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Summary of Experience

Mr. Zogby has over 40 years experience in highway safety engineering and management and motor vehicle and driver licensing administration.

Mr. Zogby's transportation career began in the Bureau of Traffic Engineering in the Pennsylvania Department of Highways, where he was responsible for the statewide application of highway signs and markings. He was instrumental in developing the state's first automated accident record system in 1966. In the late 1960's he helped initiate and was project director for the statewide safety improvement program and the state's in-depth accident investigation function.

Mr. Zogby worked in the private sector in traffic safety research for several years before returning to public service as the Director of the Bureau of Accident Analysis in the Pennsylvania Department of Transportation. He was appointed Deputy Secretary of Transportation for Safety Administration in February of 1979, a position he head for 13 years, until his retirement from public service in December 1991.

Since his retirement from state government, Mr. Zogby has been engaged as a consultant on management and policy issues for federal, state and local government agencies in the area of transportation safety and motor vehicle/driver licensing services.

Professional Business Experience

- Subcontract with GeoDecisions Consulting on a Safety Analysis Management System (SAMS) for the state of Mississippi.
- Subcontract with iTRANS Consulting, Inc. on NCHRP project 17-18-(05), Integrated Management Process to Reduce Highway Injuries and Fatalities Statewide for the Transportation Research Board.
- Contract with the National Academy of Sciences (NAS) to provide AASHTO Strategic Highway Safety Plan – Case Studies (17-18(06A) for the Transportation Research Board.
- Subcontract with ISG, a systems integration consulting company, conducting a re-engineering contract with the Pennsylvania Department of Transportation in the area of motor vehicle processes.
- Subcontractor with the Pennsylvania State University to research the impact of an education provision in state law governing novice drivers.
- Conducted a three week course on safety management for the Ministry of Communications in the Kingdom of Saudi Arabia.

- Subcontractor with a Moroccan engineering firm to develop a national highway safety plan for the country of Morocco.
- Completed a study for the state of Mississippi, Department of Public Safety to develop a Strategic Plan for Highway Safety Information.
- Contracted by the Federal Highway Administration, Office of Motor Carrier Safety to help in the final implementation phase of the Commercial Driver License (CDL) program.
- Participated as a team member conducting Traffic Records Assessments with states in assessing their Traffic Records capabilities to address highway safety program management needs
- Project director and principal instructor for a Federal Highway Administration (FHWA) contract to develop, implement, and instruct a training program for the Highway Safety Management System.

Professional Societies and National Committees

- Member Institute of Transportation Engineers (ITE).
- Member Emeritus of the Transportation Research Board (TRB) Committee on Transportation Safety Management.
- Member of Association of Transportation Safety Information Professionals.
- Past President of the Mid-Atlantic Section of ITE.
- Past Chair of the National Safety Council's Traffic Records Committee.
- Past President of Region 1 of the American Association of Motor Vehicle Administrators.
- Past Chair of the Governing Board of the International Registration Plan.
- Past Chair of a subcommittee of the NGA Working Group on State Motor Carrier Taxation and Regulation.
- Completed six year tenure as the Chair of the TRB Committee on Planning and Administration for Transportation Safety.

Community

- President, Duncannon Area Revitalization, Inc.
- Pastoral Associate, St. Bernadette Church, Duncannon, PA.

Education

- B.S., Economics, Villanova University
- MPA, Penn State University